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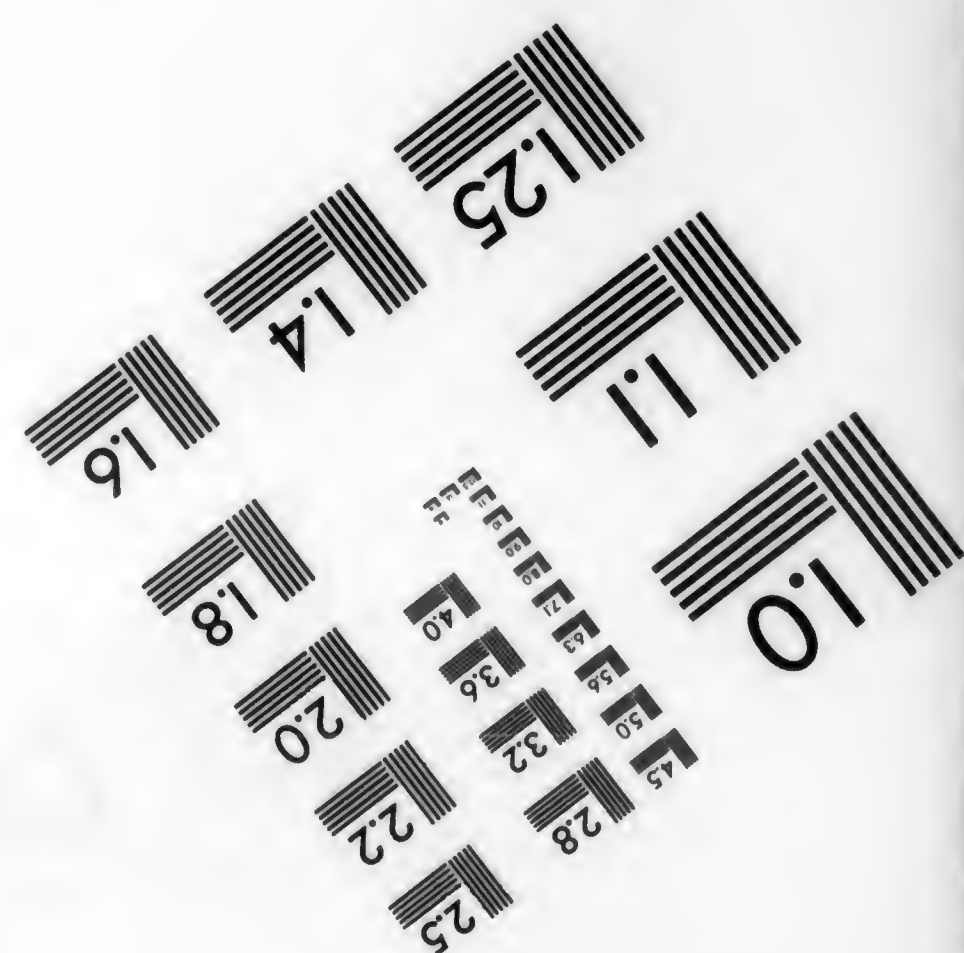
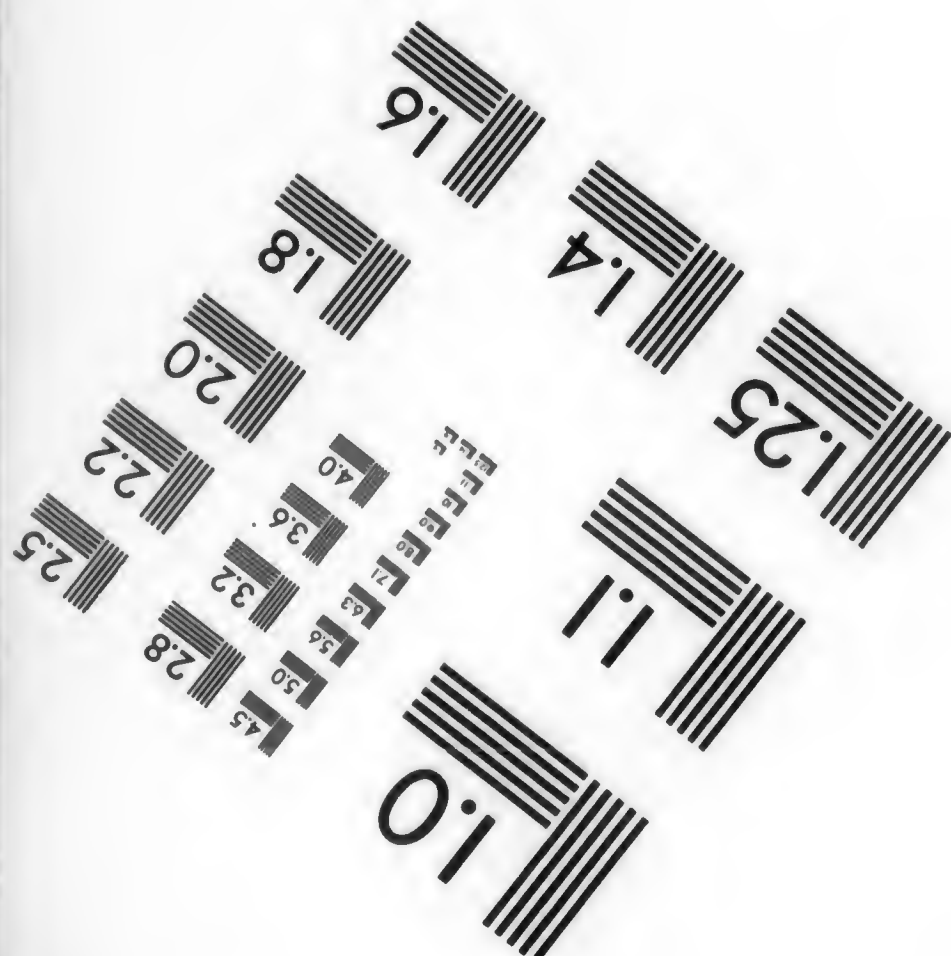
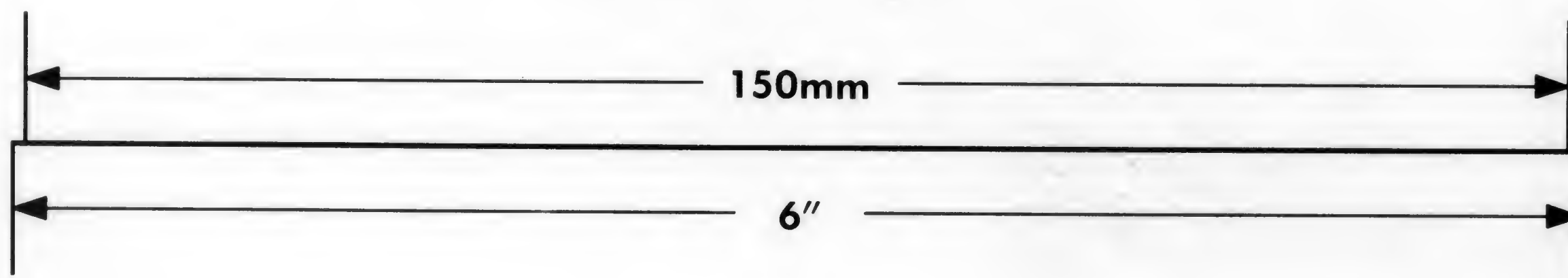
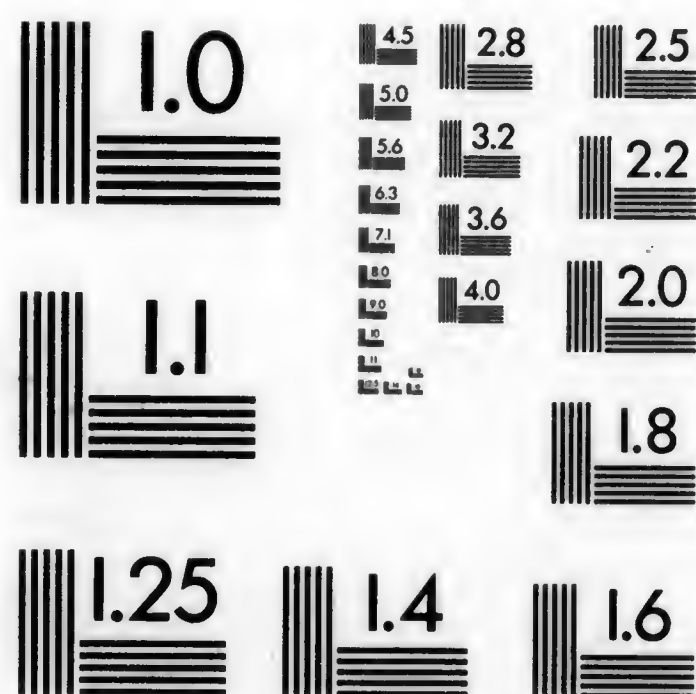
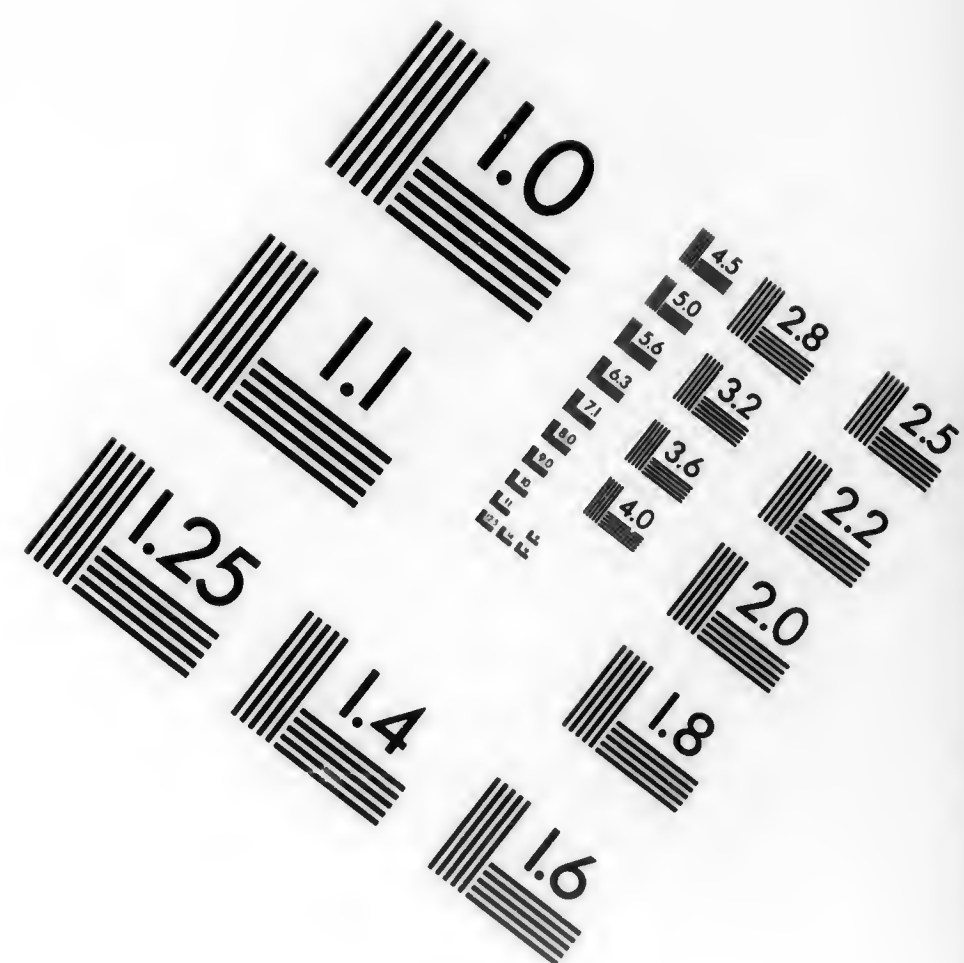
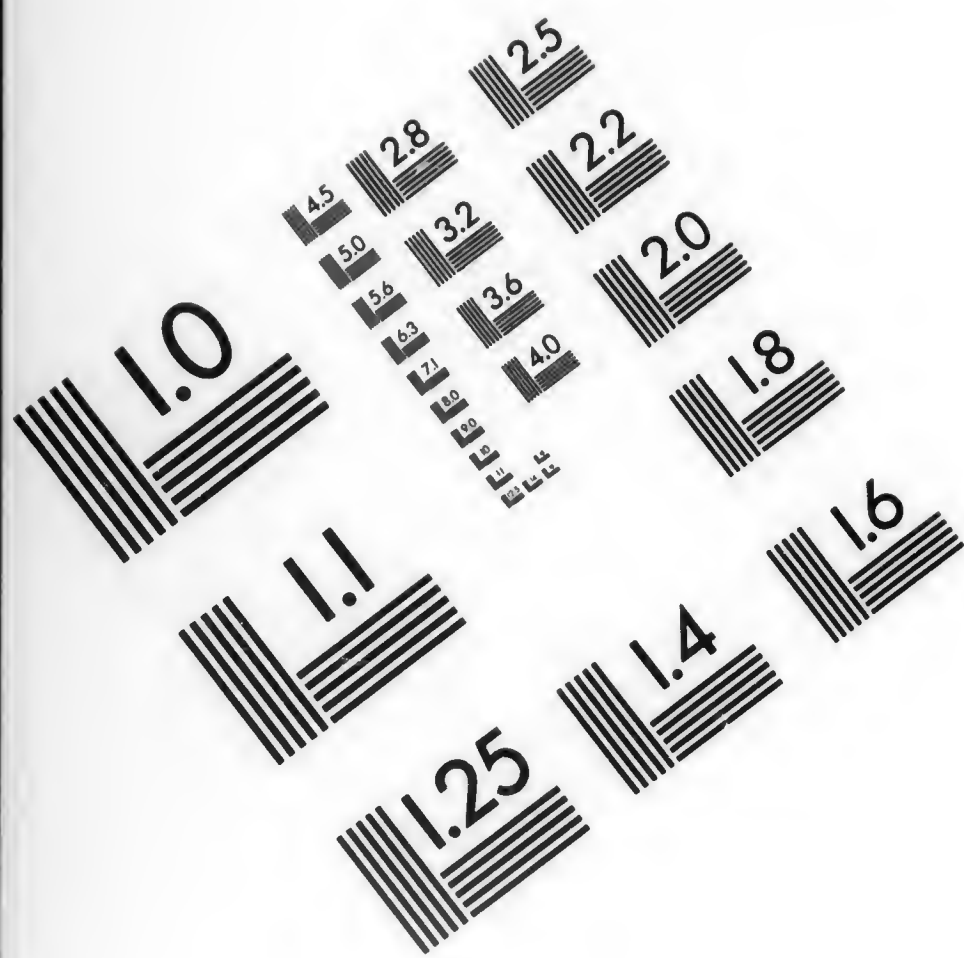
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Volume:

23

STATE COLLEGE

FOREST LEAVES

FEBRUARY, 1931



PUBLISHED BY THE
PENNSYLVANIA FORESTRY ASSOCIATION
PHILADELPHIA, PA.

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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 714 Commercial Trust Building, Philadelphia.

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PRESIDENT EMERITUS—Dr. Henry S. Drinker
VICE-PRESIDENTS—Robt. S. Conklin, W. B. McCaleb, Edward Woolman
TREASURER—F. L. Bitler
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PHILADELPHIA, FEBRUARY, 1931

Whole Number 260

NARRATIVE OF THE ANNUAL MEETING OF THE PENNSYLVANIA FORESTRY ASSOCIATION

THE Annual Meeting of the Pennsylvania Forestry Association was held as a luncheon meeting at the Adelphia Hotel in Philadelphia on December 8th, 1930.

We were glad to have with us a number of visitors from the Pocono Forestry Association and the Society of Little Gardens, bringing the total attendance to 47.

The luncheon gave the opportunity for better acquaintance among our members and with our visitors, and at its conclusion President Smedley made an address which will be found on another page.

The Treasurer's Annual Report was read, the details of which are printed separately in this issue.

The Annual Report of the Secretary was read in condensed form, and is printed in its entirety in another portion of its publication.

For the election of officers and members of council for the ensuing year, the Chair appointed Messrs. Brouse and Hoopes as Tellers, who distributed and collected the ballots, and there being but one nominee for each position, on motion the Secretary was instructed to cast a ballot for the list, as follows:

President, Samuel L. Smedley.
President Emeritus, Dr. Henry S. Drinker.
Vice-Presidents, Robert S. Conklin,
W. B. McCaleb,
Edward Woolman
Secretary, C. P. Birkinbine.
Treasurer, F. L. Bitler.

COUNCIL

Allegheny County, Frank J. Lanahan,
George M. Lehman,
Hon. Walter Lyon,
John E. Potter.
Beaver County, Robert W. Darragh
Bedford County, J. L. Tenley, Sr.
Berks County, Mrs. Edward Brooke,
Dr. Geo. G. Wenrich.
Blair County, W. A. Silliman
Bradford County, Miss Margaret Stewart Maurice.
Bucks County, Mrs. Elizabeth F. James,
David Burpee.
Cambria County, F. L. Carpenter.
Cameron County, Josiah Howard.
Carbon County, A. C. Neumuller.

Centre County, Theodore D. Boal,
Prof. J. A. Ferguson.
Chester County, Robert G. Kay,
Miss Esther G. Leggett,
Norman Ratchford,
Dr. H. A. Rothrock.
Clarion County, Hon. F. L. Harvey.
Clearfield County, W. F. Dague.
Clinton County, Chas. Hogeland.
Columbia County, C. R. Woodin.
Cumberland County, J. S. Illick.
Dauphin County, W. Gard. Conklin,
George H. Wirt.
Delaware County, Ellwood B. Chapman,
Herman Cope,
Edwin A. Hoopes,
Dr. J. Clinton Starbuck.
Erie County, Miss Dorothea K. Conrad,
George S. Ray, M.D.
Fayette County, C. L. Snowdon.
Franklin County, Geo. S. Perry,
John R. Williams.
Fulton County, W. L. Byers.
Greene County, M. E. Carroll.
Huntingdon County, Mrs. J. C. Blair.
Indiana County, Hon. Joseph O. Clark.
Jefferson County, W. N. Conrad.
Lackawanna County, Mrs. J. Benjamin Dimmick,
Hon. L. H. Watres.
Lancaster County, A. L. Eby.
Lawrence County, Wm. M. Brown.
Lebanon County, William C. Freeman.
Lehigh County, General Harry C. Trexler.
Luzerne County, Dr. Alexander Armstrong,
Cornelius B. Kunkle,
Alvan Markle,
William R. Ricketts,
Samuel D. Warriner.
Lycoming County, Henry E. Kirk.
Mercer County, George Rettig.
Mifflin County, F. W. Culbertson.
Monroe County, R. W. Stadden.
Montgomery County, Mrs. Albert C. Barnes,
Miss Mary Blakiston,
Dr. H. M. Fisher,
Miss Mary K. Gibson,
Edgar W. Nicholson,
Dr. Henry K. Pancoast.
Monroe County, H. T. Hecht.
Northampton County, Prof. R. W. Hall,
H. S. Snyder.
Northumberland County, Charles Steele.
Philadelphia County, Dr. J. M. Anders,
Richard L. Austin,
Samuel N. Baxter,
Owen M. Bruner,
Mrs. Brinton Coxie,
W. Warner Harper,
Grover C. Ladner,
J. Franklin Meehan,
Harold Peirce,
Eli K. Price,
John H. Webster, Jr.,
Albert B. Weimer,
Edward Wildman.

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Pike County, Hon. Gifford Pinchot.
 Potter County, Harry E. Elliott.
 Schuylkill County, A. C. Silvis.
 Somerset County, V. M. Bearer.
 Sullivan County, E. F. Brouse.
 Susquehanna County, Francis R. Cope, Jr.
 Tioga County, Paul H. Mulford.
 Union County, Raymond B. Winter.
 Venango County, S. Y. Ramage.
 Warren County, Walter W. Beaty.
 Wayne County, Hon. Alonzo T. Searle.
 Westmoreland County, Hon. D. J. Snyder.
 York County, Edgar P. Kable.

President Smedley read a letter recently received from Prof. J. A. Ferguson, advocating the purchase of available waste lands for town and county forests, stating that large areas were now available at low rates, and mentioning a purchase he had recently made.

The following two resolutions were offered and adopted:

WHEREAS, We have learned with sorrow of the death of John J. Tyler;

AND WHEREAS, We have learned that his estate has been left in charge of the Provident Trust Company as Trustee to be converted into the John J. Tyler Foundation, the income of which is to be devoted to charity;

AND WHEREAS, In this estate there are included both the Old Painter Arboretum, founded over 100 years ago, containing many fine specimens of rare trees, and also a large tract of several hundred acres adjoining it containing a number of acres of heavily timbered woodland, rich in botanical interest;

AND WHEREAS, These lands are located in close proximity to the most rapidly developing section of Pennsylvania where there is a crying need for park lands and open areas for recreational purposes;

AND WHEREAS, We believe there is no broader charity whereby a larger number of persons can receive benefit than through the establishment of permanent park areas;

Therefore, be it Resolved, That the Pennsylvania Forestry Association, which for nearly fifty years has been active in the preservation of the forests of Pennsylvania, recommends to the Trustees of the J. J. Tyler Foundation the desirability of establishing this entire tract as a public park and sanctuary for the benefit of the people, and to that end the Pennsylvania Forestry Association pledges to the Trustees whatever support it may be able to give toward carrying out this proposal.

The Pennsylvania Forestry Association, at its annual meeting held December 8th, 1930, records

with sorrow the death of John J. Tyler on October 29th, 1930.

We wish to extend our deep sympathy to his widow and his family.

We recall, individually and as an association, the pleasant interviews we have had with him at Painter's Arboretum in times past, and wish to express our appreciation of the fact that all these years he has held intact not only the Arboretum, but also the large adjoining acreage so rich in natural beauty and scientific interest.

Realizing the great need for preserving not only the Arboretum, but the whole area for the enjoyment of future generations, we wish to pledge our hearty support to any movement to that end.

We wish this note recorded on our minutes and direct that a copy of it be sent to Mrs. J. J. Tyler.

The Chair appointed a committee for this matter, the same committee to also act as a Legislative Committee. The members are:

Grover C. Ladner	W. B. McCaleb
F. L. Bitler	Edward Woolman
Ellwood B. Chapman	Samuel L. Smedley,
Herman Cope	Ex-officio.

Mr. Chapman moved and it was carried that the Association request that \$5,000,000 be included in the State budget, to be allotted to the Department of Forests and Waters for the purchase of lands for State forests.

Mr. Wildman suggested that this be put in the hands of the new committee on legislation.

The members and guests then enjoyed an interesting and informing talk on "Methods of Finding Facts in Forestry," by Mr. Forbes, Director of the Allegheny Forest Experiment Station.

The Chair expressed for those present our thanks and appreciation of Mr. Forbes' courtesy.

On motion the meeting adjourned.

PRESIDENTIAL ADDRESS

THE year 1930 has not been without developments that mark an ever-increasing interest in forestry and questions pertaining thereto. On June 5th, some three hundred citizens from this and other States gathered at Mont Alto to join in the exercises pertaining to the opening of the Pennsylvania Research Institute. Our National Government has such institutes, but Pennsylvania is the first State to take such a step. For its inception and organization, we are indebted to a fellow-member who has had many years' experience in practical forestry and also the vision of what the future will require—Dr. Joseph S. Illick.

Our summer meeting, held at Williamsport and Eaglesmere, was not only interesting but enjoyable. This was made possible by being in one of the many picturesque sections of Pennsylvania, full of lumber and forestry lore, and being entertained so sumptuously by those who acted as "mine host."

Honorable Chas. E. Dorworth, Secretary of Forests and Waters, in his address stressed a feature never before referred to by the head of the Department, a feature very near the hearts of many of us; namely, the establishment of State Parks. Some of our adjoining States are spending millions of dollars in this direction while Pennsylvania has done very little. Our citizens are entitled to such provisions for recreation, particularly so within the reach of our great centers of population.

Evidently, the Secretary's remarks fell on good ground for we are rejoiced to note that there has recently been formed what may be called our sister organization, the Pennsylvania Parks Association. Our best wishes for its success, and the assurance that it has our hearty support.

As in many other States, the area of unproductive land is increasing at an alarming extent. In Pennsylvania, from 1920 to 1925, 250,000 acres were given up. It is estimated that there are today 4,000,000 acres in our State to which attention should be given as to the best uses to which it can be put. Members of the Agricultural Staff at State College have recently made a study of conditions in Tioga County, the results of which were of such a character that the college authorities think these studies should be carried on in several other counties in the northern section of the State. Some localities may be profitable for dairying, pasture, cattle, or sheep, forestry, game refuges, State Parks, etc. Conditions differ in different counties. In some, there are killing frosts nearly every month in the year. In others, road conditions make it impossible to get to and from their farms a large part of the year.

In New York State, one-fifth of the agricultural land has been abandoned. So serious has become the situation that the State has appropriated \$20,000,000 for the purchase and reforestation of these lands. It surely behooves us to make strenuous efforts during the coming session of State Legislature for funds to acquire lands that will soon drift into other hands for all time.

Our State has a nation-wide reputation as one of the greatest game States in the Union. This fact is attracting sporting clubs and private citizens who are buying up desirable locations on which the public should have the privilege of gun-

ning and camping. For a number of years, we have advocated town and county forests. This would provide smaller areas for the public. These, under our present arrangement, would be too small for the State to care for.

In New Hampshire and Massachusetts, much attention is being given to town forests. In the latter State, eighty-eight towns have purchased land varying in size from 5 to 5,000 acres for that purpose.

Herein lies a field in which we can cooperate with the State Parks Association, thereby speeding the restoration of "Penn's Woods."

Since its organization, our association has initiated many activities in furthering the cause of forestry in our State.

Owing to the recent death of John H. Tyler, there is likely to come on the market a tract of land of over 700 acres containing one of the largest areas of heavy timber under one ownership within twenty-five miles of Philadelphia. It is situated in Middletown Township, Delaware County, and in close proximity to one of the most rapidly growing sections of Pennsylvania.

It is also nearly all included in the proposed forest and park area suggested by the Regional Planning Federation.

I strongly recommend the appointment of a committee to initiate a movement or join with a similar organization interested in the conservation of our natural resources looking to the acquiring of this tract for a public park or recreational grounds.

There has been quite an addition to our membership the past year, but it is with sorrow we note the passing of quite a number of those who have been active in our association for many years, so our membership has not increased in numbers as we would like.

As I have indicated, there are many opportunities in which we can justify our existence. To meet these demands, additional members are necessary. These will not only increase the interest but also assist financially, which we are very much in need of. The acquisition of one and one-half million acres for forest purposes by the State does not lessen our call, and it will not be lessened until after 5,000,000 acres have been acquired.

SAMUEL L. SMEDLEY,
 President.

In order to reduce unemployment in woods operation, the government of the Province of Quebec, Canada, has offered to accept half the usual stumpage dues for burned timber cut before March 31, 1931.

TREASURER'S REPORT

THE fiscal year of the Pennsylvania Forestry Association ends on December 1st, 1930. The statement of finances on that date was as follows:

TREASURER'S STATEMENT ON DECEMBER 1, 1930.

	Dr.
To Balance on hand Dec. 1, 1929	\$26.88
Cash, annual dues to Nov. 30, 1930.....	1,758.00
Cash, donations and subscriptions.....	621.21
Cash, sale of FOREST LEAVES and advertisements	112.00
Cash, interest on life membership and FOREST LEAVES bonds and bank deposits	649.31
Cash, sale of securities	399.76
Cash, Life Membership fees	50.00
Cash, FOREST LEAVES fund	52.00
Total	\$3,669.16

	Cr.
By Cash, office expenses, postage, etc.....	190.37
Office rent	660.00
Publication of FOREST LEAVES	1,284.99
Secretary's salary	600.00
Expenses of meetings	182.60
Life Membership Fund	50.00
FOREST LEAVES Fund	52.00
Membership in Pennsylvania Conservation Council	25.00
To permanent fund	399.76
Balance on hand Dec. 1, 1930.....	224.44
Total	\$3,669.16

FOREST LEAVES FUND

Invested	\$2,281.42
In bank	52.00
Total	\$2,333.42
Special bequest for FOREST LEAVES	\$500.00

LIFE MEMBERSHIP FUND

Invested	\$6,145.00
In bank	623.76
Total	\$6,768.76

GENERAL FUND

Bequests, etc., invested	\$7,209.49
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F. L. BITLER, Treasurer.

The cash receipts from the National Forests for the last fiscal year from the use of timber was \$4,389,893, from forage \$1,942,914 and miscellaneous uses \$418,746, a grand total of \$6,751,553.

RECOVERY OF THE CHESTNUT IN PENNSYLVANIA

THE Department of Forests and Waters has issued Research Circular No. 1, bearing the above caption.

This circular was prepared by John E. Aughanbaugh, Research Forester, and those who are interested should write for a copy.

The following conclusions have been reached by Mr. Aughanbaugh:

1. The chestnut blight made its appearance in Pennsylvania in 1909. It was observed first in the eastern part of the State, from where it progressed rapidly to the central and southern and later to the northern and western parts. Now it is present in all parts of the State where the chestnut is found.

2. The loss of the chestnut was particularly serious, for it was the commonest and most valuable tree in Pennsylvania at the time the blight made its appearance.

3. The destruction of the chestnut was so rapid and complete that the outlook for its future soon became very discouraging, and many persons still think it is hopeless.

4. During the past few years, reports have been coming to the Department of Forests and Waters indicating that the chestnut may be starting slowly to work its way back into the forests of Pennsylvania. These reports are being received in increasing numbers. The State-wide importance of this tree suggested the need for a special study of the situation. This study was undertaken in the Fall of 1929, and some interesting preliminary observations and conclusions are now available. These recent studies indicate that the chestnut shows the greatest promise of recovery: (a) on areas where the chestnut was cut before it was completely killed by the blight, (b) where sprouts originated from small stumps or seedling-sprouts, (c) on slopes with a warm southern or southwestern exposure, and (d) where overhead shade is not too dense.

5. The persistent sprouting ability of the chestnut is its main hope. For 20 years it has persistently met its death loss with repeated crops of new sprouts. In some regions, as many as eight different generations of sprouts have already appeared. The blight has not yet been able to kill all the root systems from which sprouts develop. These sprouts are the main battle-ground of the blight.

6. In many coppice clumps, individual sprouts are becoming larger with each succeeding generation of sprouts. Many sprouts, three to four inches

in diameter, are now growing in the forests. The largest sprout recorded was five inches in diameter and 35 feet high when 12 years old. This sprout now carries three blight cankers, none of which appears to be serious.

7. Many of the larger sprouts, ranging from three to four inches in diameter and from 6 to 12 years old, are beginning to bear fully formed chestnut burrs containing a fair percentage of mature nuts. This indicates that the chestnut is resisting the blight, or that the disease is becoming less virulent.

8. More cankers are now required to kill a sprout than in the early days of the blight. It is not uncommon to see a sprout struggling tenaciously with as many as a dozen cankers upon it. In the early days of the blight, a single canker was often sufficient to kill a tree.

9. Marked changes in the general appearance, form and virulence of the blight cankers have been noted. The swollen hypertrophied type of canker is now becoming more common. This type, caused by the tree's efforts to grow new wood to resist the disease, appears to be less destructive than the round lesion type, which was most common in the earlier years of the blight. Inactive or healed cankers are becoming more numerous. In many sections of Pennsylvania numerous partially healed cankers can be found.

10. Sites upon which the chestnut has been able to develop into the largest and most thrifty sprouts, despite the destructive effort of the blight, offer the greatest hope for its future development. Only under favorable conditions can the chestnut be expected to work out its salvation. No practical human control measures have yet been found, and it appears that nature must work out its own method of control.

11. The peak of the chestnut blight has passed too recently to definitely foretell its future developments, but each year gives additional evidence signifying that this destructive disease has passed its climax in Pennsylvania. There is a growing justification for the hope that it may eventually recover much of its lost ground in the forests of this Commonwealth.

"The place for trees is in the woods." With these words the mayor of a town in Massachusetts chopped down some fine old elms in front of his oil station. The wrathful townspeople put him in jail! But they cannot replace the trees.—*Better Homes and Gardens*.

THE NATIONAL FORESTS

THE Hon. Arthur M. Hyde, Secretary of the U. S. Department of Agriculture, in his report to President Hoover for the year 1930, made a number of references in regard to the National Forests from which the following data has been excerpted:

The national forests are administered with a view to obtaining from them the largest net total of public benefits. Their resources are very great. During the year their net area—that is, the area of federally owned land within their boundaries—was increased by 340,297 acres, to a total of 160,090,817 acres. Their use by the public exceeded in various particulars all previous records, with a greater cut of timber, greater total receipts for uses involving a charge, and a greater number of recreation visitors by several million than in the preceding or any earlier year. Through their wise development, their scientific management, and careful safeguarding of their productivity their public value and services can be made to increase still further and immensely.

Severe drought made protection of the national forests against fire in the summer and fall of 1929 exceptionally difficult. Never before in the history of national-forest administration had the western fire season had so late a close. The expenditures of the year for fire suppression alone exceeded \$3,400,000. The estimated damage to the Federal properties exceeded \$4,300,000, of which nearly \$4,000,000 represented timber and reproduction destroyed. The fires burned over more than 978,000 acres of land within the national forests, of which more than 799,000 acres were owned by the Government. Only twice has a greater area been burned over, and only three times—in 1910, 1919, and 1926—has the estimated damage been greater.

Since 1891, the year in which the President was authorized to create reserves, the western system of national forests has been moving gradually toward its completion. At the same time the available area has been progressively diminishing through disposal of the public-domain timberlands under other laws. Nevertheless there is left a considerable acreage of unreserved and unappropriated public land having forest values for timber production or watershed protection that justify and make desirable its inclusion in national forests.

More than four-fifths of the forest land west of the Plains, not including that in Alaska, is now in public ownership. This includes national forests and national parks, State and municipal forests

and parks, Indian reservation and open public domain forest lands, and State forest lands for which no policy of administration is in sight. Private ownership accounts for the rest. Every effort should be made to encourage and facilitate private forestry on this land. Nevertheless, public ownership will eventually have to take over more of the western forest area.

Although the law set no regional limitations on purchases, it was accepted as providing for the building up of a small system of eastern national forests that would be confined to the mountain ranges of the southern Appalachians and to the White Mountains of New Hampshire and southwestern Maine. It was believed that Federal administration of well-chosen strategic areas totaling 5,000,000 acres in the southern Appalachians and 1,000,000 acres in the White Mountains could lead the way to right management and use of the forests of the two regions. But as acquisition advanced, forest exploitation also advanced. The result was to enlarge in these regions the area requiring Federal administration to protect navigable streams, as well as to make clear that protection should be extended to various similar areas outside the regions.

The present program is limited to putting into effect the intent of the two laws providing for forest-land acquisition. It is not a program based on a broad survey of the requirements of the eastern forest situation. It calls for the acquisition of a total of approximately 9,500,000 acres, of which the major part will be added to some 6,000,000 acres already owned or under contract of purchase by the Federal Government to protect the headwaters of navigable streams. The rest will be acquired primarily to aid in timber production and to demonstrate forestry practice in the southern pine and the northern Lake State regions. The Federal Government already has about 1,800,000 acres in these regions, mainly derived from the reservation of areas of public lands. If this program is to be carried out within a reasonable time, the rate of acquisition will need to be substantially accelerated. A forward step was taken by Congress, near the close of the fiscal year, in authorizing appropriations up to \$3,000,000 in each of the fiscal years 1932 and 1933.

The completed program will provide an eastern system of national forests containing some 16,000,000 acres of Government-owned land, chiefly in areas selected for their value in protecting the headwaters of the principal navigable rivers, in other words, chiefly mountain lands. But the needs

of the East for permanent forests to control floods and erosion will not be met by this program. It will take care of only a minor part of these needs. Still less will it meet the needs of the East for public ownership and management to insure and promote timber production. In the eastern half of the United States approximately 350,000,000 acres are classed as forest land. In addition there are many million acres of marginal and submarginal farm lands which might better be used for forest purposes than for farming, and which will sooner or later largely revert to forest.

EROSION STREAM FLOW INVESTIGATIONS

THE report of the U. S. Forest Service makes some interesting statements in regard to soil erosion as follows:

To determine the part that forests play in the control of erosion under varying local conditions, existing studies were amplified and new ones were initiated. Two are of particular note. In the regions where they are conducted erosion contributes heavy burdens of silt to the Mississippi River. One concerns the easily eroded fine silt loam uplands east of the lower Mississippi River.

The soil is sometimes 75 feet deep. A survey of several counties revealed that from 0.3 to 8.3 per cent. of the cleared land was actively eroding. Land was found which in 20 years had made the complete cycle from forest through cultivation to abandonment. Forestry control measures are being developed to prevent further soil loss on areas permanently wrecked for agriculture.

Erosion is critical in southwestern Wisconsin also. Measurements of silt caught in silt traps indicated that forests are the form of vegetative cover most effective in holding the soil. Hay lands when in good condition hold soil nearly as well, but more rain runs off. Bluegrass pastures with unbroken sod hold the soil firmly, but when they are closely grazed gullies are apt to form. Closely grazed pastures are very ineffective in retaining water and deliver almost all of it to places where erosion may occur. Cultivated fields erode badly, especially where cultivation does not follow the contours. To control erosion contour-plowing, terracing, the construction of dams in gullies, and the diversion of water above the fields are suggested. Keeping land in forest immediately above cultivated fields is an effective farm-management measure.

Fifteen years' measurements and observations

in Utah have shown how the restoration and proper grazing of high mountain range lands lessen surface run-off, soil erosion, and the intensity of summer floods. Increasing the herbaceous vegetation approximately two and one-half times had little if any effect on surface run-off from melting snow, but the burden of sediment in this run-off was reduced 57 per cent. Run-off from summer rains, which even under the depleted plant cover furnished only 5 per cent. of the yearly surface run-off but carried 85 per cent. of the eroded material, was cut more than half by the increase in vegetation, as was also the soil erosion due to them. A good herbaceous plant cover usually will not prevent flash summer floods from sudden heavy rainstorms in mountainous regions similar to those studied, but to a considerable degree will check torrential run-off and reduce floods. Because of the small portion that summer rainfall run-off makes up of the total annual surface run-off, any reduction in the summer surface run-off has no appreciable effect on the annual water supply. The maintenance of a good plant cover on the watersheds, by reducing the destructiveness of soil erosion and of summer flash floods, leaves the water-courses in a condition in which they can carry off the heavy spring flood from melting snow without destructiveness. A manuscript setting forth these findings was prepared for publication.

Preliminary studies were started on the Boise River watershed in southern Idaho during the year and produced the following interesting results: (1) There appears to be a definite relationship between quantity of precipitation and quantity of total stream flow over periods of years, although individual years may show remarkable variation. (2) The average date when the stream flow of the Boise River has fallen below an amount required to prevent drawing on reservoir storage has been June 23 during the 10 years starting in 1920, as compared to June 29 during the 24 years 1895 to 1919. (3) Averaging the flow of the Boise River for 10-day intervals by 5-year periods shows prior to 1915 an average date of peak flow between June 1 and June 10, while since 1915 the average date has been between May 11 and May 20. (4) Recent serious erosion is associated with depletion of the natural plant cover by overgrazing, trampling by livestock, drought, rodents, and fire. The situation is of so critical a nature that it justifies far more intensive study than can be made with present funds.

General studies of the relation of semidesert brush and herbaceous plant cover to erosion on the Roosevelt Reservoir watershed in Arizona es-

tablished the fact that, under the conditions there found, shrubs or trees must have sufficient density for the ground surface to be controlled by litter, or must be supplemented by herbs, in order to prevent erosion effectively. Otherwise soil depletion is a constant process, at first between shrubs and trees and later under their crown spread. Areas within the semidesert brush zones where grasses have not been depleted do not show evidence of abnormal erosion. An area of approximately 60 acres, with rather steep slopes, that has been protected in part for 20 years, has revegetated to grasses and other herbs until they now occupy 35 per cent. of the ground surface, and the sediment carried by run-off is so slight it could not be measured. The common practice in the region, however, has been to graze much of the range year-long with such numbers of livestock that the grass growth is completely utilized long before a new supply becomes available. The stock then have to be maintained on brush until new grass growth appears. Consequently, following each year or cycle which does not receive rainfall in quantity or character favorable to the growth of grass, the grass density very rapidly declines. In the absence of grass the fine surface soil that was built up by and supported grass washes away rapidly. One 60-acre area with a 7 degree slope had over 2,000 cubic feet of soil eroded from it in less than two years. Another area with a steep slope lost an average of one-half inch of soil in less than a year. A vast amount of material has accumulated recently in small and large drainage lines, ready for transportation to the main river or the reservoir during the next period of excessive precipitation. The last 10 years have been deficient in precipitation. The very marked shortage of water supply and the extreme erosion occurring over a large part of the watershed demand an intensive study to determine what plant cover encourages the maximum of storage water with the least silting of reservoirs and how this cover may be restored and maintained under the periodic droughts which prevail in the region.

A forest insurance study was organized as part of the program of the Pacific Northwest Forest Experiment Station, to appraise the possibilities and formulate principles of fire insurance as an aid to private forestry. The past year was devoted to an exploratory study of literature and experience at home and abroad, to establishing advisory and cooperative contracts, and to preparing plans for more intensive work.

BLIGHT-RESISTANT CHESTNUTS COLLECTED IN THE ORIENT

R. KENT BEATTIE for two and one-half years has been searching the domains of the Formosa head-hunters and the forests of Korea and Japan for blight-resistant chestnuts to plant in American forests.

During two and a half years in those lands Mr. Beattie collected about 250 bushels of chestnuts of native strains, and scions of about 90 cultivated varieties. He shipped these nuts and scions to Washington as fast as he collected them and the Department of Agriculture planted them in its forest nursery at Glendale, Md., to test their resistance to blight and their adaptation to the climate and soil of a new homeland. These plantings produced about 250,000 seedlings.

Last spring the department placed 73,000 seedlings grown from Mr. Beattie's 1928 collections with foresters and experiment stations in Connecticut, Massachusetts, New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Virginia, North Carolina, Georgia, Alabama, Tennessee, Kentucky, Louisiana, Ohio, and Michigan for testing.

Pathologists and foresters hope that blight-resistant chestnuts eventually will be established throughout the chestnut-growing States, where blight is rapidly depleting the stands of native chestnut. The American chestnut is still the source of more than 50 per cent. of our vegetable tannin. Tests by the department show that the Japanese chestnut is an equally good producer of tannin.

Mr. Beattie reached Japan in the summer of 1927. He visited the areas of Japan where the chestnut grows and arranged with official foresters and chestnut growers to ship nuts to him at Tokyo or Yokohama. When the nuts arrived they were immersed in hot water to kill worms, dried and packed in damp moss and put in cold storage. The nuts remained in cold storage until they arrived in Maryland.

Japan is carrying out a wonderful reforestation program, says Mr. Beattie. The Japanese have been tree-lovers for generations and are great tree planters. All untillable areas in the Empire where trees will grow are kept in well-ordered forests. Trees, growing row on row, bank behind bank, on the steep mountainsides, present an inspiring sight, Mr. Beattie says. The Japanese value the chestnut especially for its nuts, which are an important item in their diet. The same

chestnut blight organism that is rapidly depleting America's chestnuts exists in Japan also but does not injure trees there seriously.

The Koreans are not tree-lovers, partly because tigers infest their forests, Mr. Beattie believes. For many years Koreans have cut down the trees and dug up the roots. But during the 18 years of Japanese control a program of systematic reforestation has restored many of Korea's wasted hillsides.

After gathering chestnuts from every accessible region of Japan, Korea and Formosa, Mr. Beattie made a return trip around more than half of the globe, gathering information about the chestnut and related trees.

A FINNISH STUDY OF PINE ROOTS

RESULTS of a morphological study of the root system of the Scotch pine, carried out in south Finland, were reported last year by Erkki Laitakari in *Acta Forestalia Fennica*. Sites were classified on the basis of Cajander's system of forest types. The material investigated consisted of 162 pines, 25 spruce, 4 birch, and 8 aspen; 72 complete root systems were dug out and investigated.

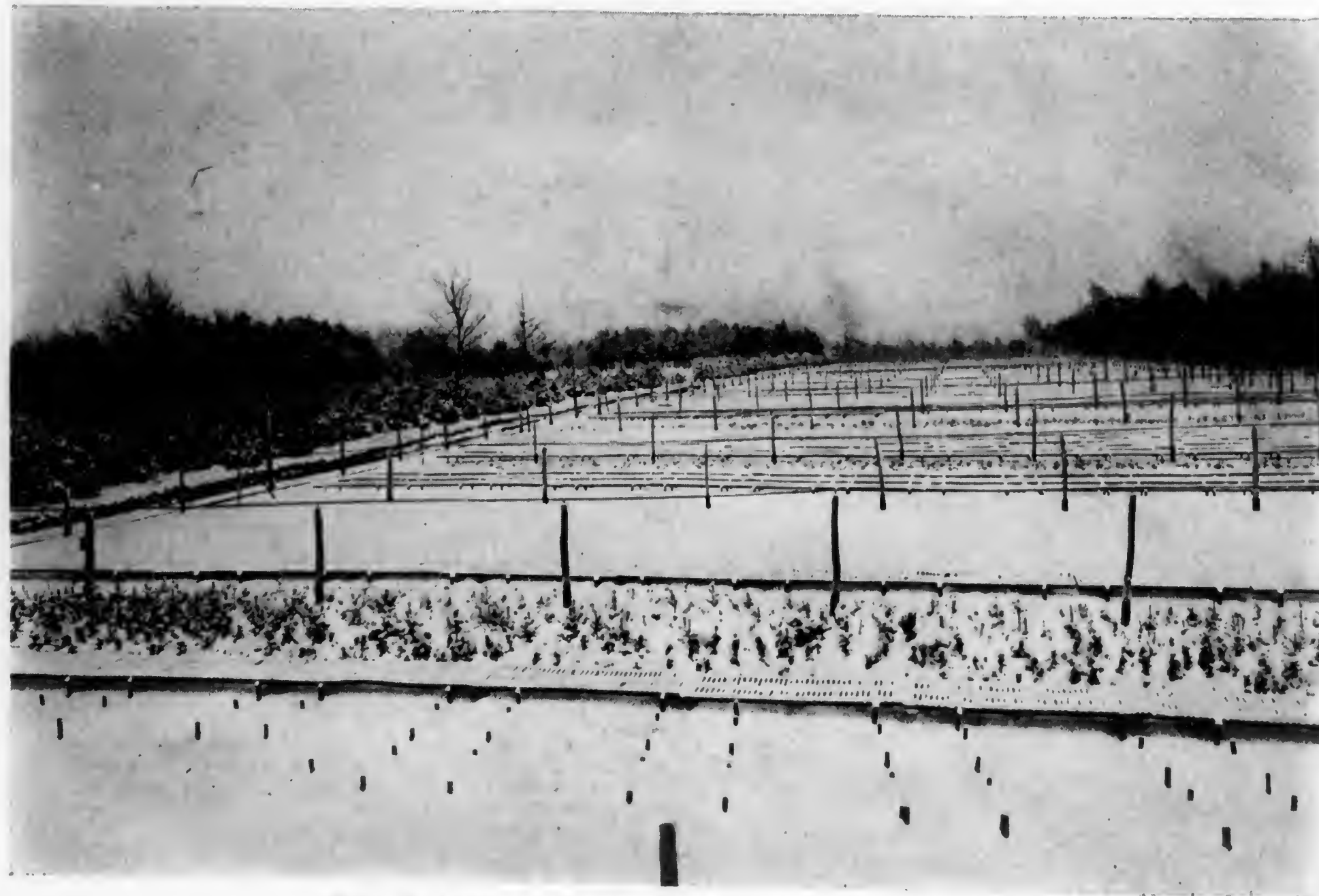
It was found that the direction of the prevailing winds in summer influences the direction of growth of the horizontal root system, in that the roots avoid the quarter of the prevailing wind and develop more abundantly in the direction whence winds blow with least frequency. Horizontal roots of pine were found to be longest on sandy heaths, clay soils, and moraine or gravel poor in stones, in the order named. Where stones were abundant in the moraine or gravel soils the roots remained short. Rich peat does not favor long roots, it appeared, but poor, wet peat does. Extent of root systems shows the same correlation to soil as length of roots. The root systems of all trees examined extended far beyond the range of the crowns.

It was found that outer vertical root systems develop, as a rule, where old stumps occur. On clayey and peaty soils the taproot and the vertical root system were absent, being replaced by a well-developed, dense horizontal system round the base of the stem.

In no case did the volume of the roots exceed that of the stem. Considerable variation was found in the ratio between stem and root volume. Large trees had comparatively smaller volumes of root than small trees. The roots were proportionately smaller in dense woods than in open stands.



THRIFTY BEDS OF TWO-YEAR-OLD RED PINE SEEDLINGS IN THE MONT ALTO
FOREST TREE NURSERY



THE CLEARFIELD FOREST TREE NURSERY IN WINTER
Photos Courtesy Department Forests and Waters.



WINTER AT THE S. B. ELLIOTT PUBLIC CAMP SITE IN THE MOSHANNON STATE FOREST,
CLEARFIELD COUNTY, PA.



ATTRACTIVE RUSTIC CAMP SHELTER AT SIZERVILLE PUBLIC CAMP, CAMERON COUNTY,
IN THE ELK STATE FOREST



THRIFTY BEDS OF TWO-YEAR-OLD RED PINE SEEDLINGS IN THE MONT ALTO FOREST TREE NURSERY



THE CLEARFIELD FOREST TREE NURSERY IN WINTER

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THE REPORT OF THE COUNCIL OF THE PENNSYLVANIA FORESTRY ASSOCIATION

DURING the past year there has been advancement in forestry in Pennsylvania, particularly in the acquisition of wild lands for State Forests by the Department of Forests and Waters. It is hoped that the State may soon be able to increase its State Forests to a total of 5,000,000 acres, which experts think is about the proper proportion of woodland which should be owned by our Commonwealth.

The Department makes the following statement:

State Forest Extensions.—During 1930 a total of 270,594 acres have been acquired in 32 different counties, at an average cost of \$2.88 per acre.

The following tabulation gives final figures by counties for all lands acquired by the State:

County	Acres
Adams	20,934
Bedford	15,414
Cambria	15
Cameron	117,386
Carbon	606
Center	113,549
Clarion	1
Clearfield	82,197
Clinton	217,504
Cumberland	28,845
Dauphin	3,808
Elk	59,865
Forest	2
Franklin	38,166
Fulton	29,106
Huntingdon	64,262
Jefferson	9,013
Juniata	8,790
Lackawanna	5,275
Lycoming	118,075
Luzerne	11
Mifflin	53,001
Monroe	6,400
Perry	31,735
Pike	58,630
Potter	249,378
Snyder	27,854
Somerset	10,847
Sullivan	37,472
Tioga	88,226
Union	55,510
Westmoreland	5,113
Wyoming	1,177
Total	1,558,167

Extension of the State forests is progressing satisfactorily. The State forests now total 1,558,167 acres. Voluntary offers to sell forest land to the Commonwealth continue to be made to the Department, and up to Nov. 1, 1930, the total areas of this kind amounted to 939,608 acres.

State Forest Income.—During 1930 school fund receipts from the State forests amounted to \$34,189.96, and the general fund receipts to \$34,722.08, a total of \$68,912.04. The sources and amounts of the school fund receipts were:

Wood Products and Stumpage ..	\$8,308.31
Minerals	2,038.41
Camp Site Leases	17,786.77
Rights of Way	2,787.16
Water Leases	476.86
Housing Rents	1,326.87
Ground Rents	585.00
Miscellaneous Receipts	880.58

Protection.—The present year has been unfavorable in forest protection, due to the extreme drought. Complete figures show 6,000 fires burning 300,000 acres, with costs of extinction amounting to \$425,000.

The extreme drought condition of 1930 resulted in a total number of fires and a cost of extinction twice as great as in any other year. It also developed conditions in the forest such as few of the forest fire wardens had ever experienced. One of the outstanding difficulties met with during the summer was the inability of the men to hold a fire after the surface flames had been suppressed.

Notwithstanding that the year 1930 stands out as a terrible year for forest fires, certain outstanding facts indicate progress. Practically all fires came to the attention of the protective organization. The public reaction against forest fires was evident in many ways, not the least of which was a more insistent demand for the punishment of those responsible for fires. Fire wardens are receiving recognition in their communities for their work. They are ready to learn, and in the face of adverse criticism, to make sacrifices. Such an organization is marching forward and will ultimately reach its goal.

The unusually large area of cut-over and brush lands that had accumulated in Pennsylvania made forest protection a particularly serious problem in the early years when these forests were attempting to come back. The high fire hazard of the young forest is lessened with age, as nature finds them better equipped to withstand the fire evil. The canopy of the interlacing crowns not only keeps the forest floor damp, but less of the forest is composed of brush sizes. Even then, should fire occur,

there is at least a surviving over-story to assist in natural regeneration. The fact that more and more of Pennsylvania's forests are annually emerging from the most hazardous years of their life, after years of protective effort, is an important factor in the progress in forest protection, especially noticeable in recent years.

Forest Tree Planting.—During 1930, 9,749,054 forest tree seedlings and transplants were distributed from the State forest tree nurseries for planting in Pennsylvania. These trees comprised the following classes of planters:

Individuals	4,128,227
State Forests	447,500
Mining Companies	1,398,000
Water and Power Companies	1,278,500
Other Industries	612,700
Other State & Federal Lands	678,141
Associations and Clubs	363,625
Municipalities and Counties	372,500
Schools and Colleges	13,811
Churches, Homes and Private Hospitals	65,050
State Nurseries	220,000
Transfer Orders	171,000
Total	9,749,054

Forest tree planting outside of the State Forests during 1930 comprised 9,301,554 trees supplied from State forest tree nurseries. More than 1,800 planters were represented, covering every county in the Commonwealth. Since the first trees were offered for private planting from these nurseries in 1910, a total of 92,094,432 have been distributed.

The department's present policy is to distribute fewer and better trees and cooperating more closely with planters to the end that more successful plantations result. Besides the trees supplied to individuals and planted on State and Federal lands, tree planters were represented by 30 mining companies, 40 water and power companies, 41 other industrial organizations, 61 associations and clubs, 26 municipalities, 31 schools and colleges, and 19 churches, homes and private hospitals.

Corporations that planted 100,000 trees or more were: Butler Consolidated Coal Company, 165,000; Wilmore Coal Company, Windber, 200,000; Reading Bureau of Water, Reading, 172,500; Wilmore Real Estate Company, Windber, 155,000; Hammermill Paper Company, Erie, 128,000; Berwind-White Coal Mining Company, Windber, 100,000; Maryland Coal Company, St. Michael, 100,000; Nazareth Cement Company, Nazareth, 100,000; Allegheny River Mining Co., Kittanning, 100,000; the Angelica Water and Ice Company, Read-

ing, 100,000; Richland Township Water Company, Windber, 100,000; The Mars Company, Oil City, 100,000; Scranton Spring Brook Water Company, 260,000, and Williamsport Water Company, 100,000. These 14 corporations planted a total of 1,880,500 trees. It is interesting to note that 122 water companies of Pennsylvania are engaged in reforestation of watersheds. These companies have planted 10,461,400 trees, about one-eighth of those distributed from the State forest tree nurseries. Mining companies have planted approximately 12,500,000 trees and 73 municipalities planted more than 2,500,000.

Nurseries.—The department's forest tree nurseries maintained at Clearfield, Mont Alto, Greenwood and Potters Mills, have a combined developed area of 42½ acres, a 40 per cent. increase in this year. The Milton nursery was discontinued with spring, 1930, shipments.

Seed of the following kinds and amounts were collected this fall: Fifty pounds of pitch pine and small quantities of hemlock and short-leaf pines; 100 bushels of red oak acorns; 40 bushels of white ash; 200 bushels of black walnut; and 5 bushels of yellow poplar. Large quantities of red pine and other species are still on hand at the seed storage plants from previous collections. The total annual seed requirements of the nurseries are approximately as follows:

Kind	Amount Pounds
White Pine	100
Red Pine	300
Scotch Pine	100
Pitch Pine	75
Norway Spruce	300
Japanese Larch	100
Other conifers 2 per cent. of total.	
	Bushels
Black Walnut	450
Black Locust	210
Red Oak	160
Other hardwoods 1 per cent. of total.	

Roads and Trails.—The sum of approximately \$200,000 is available for road building and improvement, as well as trail maintenance and development. Provision has been made for \$110,000 from the Forests and Waters budget for road and trail work, plus \$100,000 of Department of Highways funds for State forest roads. With this money it has been possible to keep the entire trail system of 2,400 miles on the State forests well mowed, while 1,000 miles of roads have been kept in condition for travel by automobile. Approximately 1,200 miles of wagon roads are also main-

tained. One hundred and ten miles of new roads were developed, opening up large blocks of forest lands previously inaccessible except by foot travel, and two bridges were built. With the equipment now available to the forest road organization and continued appropriations for this important phase of forest work, State forest roads are meeting the need of administration, protection, and public use as never before, and reflect a permanently satisfactory and businesslike condition. Their continued maintenance under the present plan will be less costly in the long run and the provision of a travelable road system will amply repay for the necessary expenditures to place it in a condition on the level with and meeting the needs of forest development in general.

Permanent Camp Sites.—During 1930, 299 new permanent camp sites were granted, increasing the total number to 2341. During the 18 years since the plan of leasing small plots on the State forests for the erection of cabins, summer homes, hunting lodges and similar buildings has been in effect, leases have been granted at the average rate of 130 a year, considering leases cancelled; for the past seven years the average has been 174. In the early years when few choice camp sites had been taken up the area granted frequently amounted to from half an acre to two acres. The increased demand for these sites has lessened somewhat the size of the individual areas granted, so that this now usually ranges from one-tenth to one-quarter of an acre. Natural grouping of camp site areas in the most desirable sections for this recreational use has tended to develop "camp colonies" on many of the State forests and this facilitates administration. It is interesting to note, however, that if the total number of leases now in effect is pro-rated against the total area of the State forests, there is on the average of one camp site for every square mile. With the great extension of the State forests now under way, many more desirable camp sites are being made available, and surveys of suitable camp site areas keep abreast with land additions. These camp sites are now being enjoyed by 100,000 persons annually and although the individual charge for leases is exceedingly small in proportion to the benefits derived, the camp site revenue for the last year alone amounted to \$23,000. The total camp site receipts since leases for this purpose were first granted, amounts to \$147,500. The buildings which have been erected on these sites by the lessees have an aggregate value of \$2,200,000. This large investment is considered good evidence of the confidence which the public has in the department's permanent camp site policy.

The Pennsylvania State Forest School.—Amendment of the Administrative Code by the General Assembly of 1929 authorized the Department of Forests and Waters, with the approval of the Governor, "To enter into a cooperative agreement with any State or semi-State educational institution for the joint use of the facilities of the school by such institution and the department as may be deemed advisable by the Secretary of Forests and Waters."

Under this authority the two forestry schools in Pennsylvania, those at Mont Alto and State College, were merged. The merger became effective in June, 1929.

Students entering upon the four-year course will spend the whole of the freshman year, including a summer session, at Mont Alto. At the same time they will pursue courses in botany, mathematics, mechanical drawing, compass surveying, mensuration and silviculture. They will benefit, as previously, in all the activities of administering a large State forest unit, including timber estimating; seed collection and storage; nursery practice; fire line, road and trail construction and maintenance; cleaning and thinning growing stands of timber; portable sawmill operations; and other forest activities. In addition, each student will learn to identify the trees and flowering plants of the region and become acquainted with the animal and bird life of the forest.

The sophomore year will be spent at State College, and devoted to the study of fundamental sciences, surveying, English, soils, forest ecology, and mensuration. The summer work will include training in topographic surveying under the Department of Civil Engineering at State College. Study of logging and mill operations, wood-using industries, practice in timber estimating and mapping, and silvicultural studies.

At the beginning of the junior year students will be permitted to choose among four courses, which have been given the names "Professional Forestry," "Lumber Industries," "Wood Utilization," and "Private Forestry." Further opportunity will be given to students of high standing who have shown a natural aptitude for some special phase of forestry.

The senior year will conclude with two months spent at Mont Alto, during which each student will prepare a written working plan for a large tract of timber.

A two-year ranger course, conducted at Mont Alto, is offered students who have had at least two years of high school training or the equivalent. A summer course is included. In April of the second year students will be assigned for

practical training on State or National forests, or with nursery companies, lumber companies, wood-using industries, or private forestry concerns, according to their fitness and inclination.

Forest Research Institute.—The Pennsylvania Forest Research Institute was established as a branch of the Department of Forests and Waters on January 30, 1930, and is the first institution of its kind maintained by a State government in this country. The staff consists of Director Willis M. Baker; Senior Research Foresters George S. Perry and Henry E. Clepper; Research Forester John E. Aughanbaugh; Assistant Research Forester Chester A. Coover; and Research Entomologist Josef N. Knull.

The purpose of the Institute is to bring about better forest practices on all tracts of forest land in Pennsylvania. It will also concern itself with the publication of reports, the exchange of information, the holding of conferences, the conduct of forest journeys, the training of research workers; and most important of all, it will help apply the knowledge that accumulates to the practice of forestry. The working program calls for the study of problems of immediate importance, such as forest fires, chestnut blight, forest tree insects, deer damage to forest trees, inferior tree problems, approved cutting methods, seed testing and certification, forest tree planting, natural reproduction, forest type and special tree studies, forest soil studies, wood-using studies, and a survey of the forest resources of the State.

Education and Publicity.—A substantial amount of educational and publicity material was printed and distributed during 1929 and 1930. Included among this material were 91,000 copies of eight bulletins, 40,000 copies of six circulars, and 141,000 copies of a dozen different posters. The newly established Forest Research Institute produced during 1930, the first year of its existence, four bulletins and three circulars, including papers on the recovery of the chestnut from the blight, white pine blister rust and deer damage to forest trees, which evoked widespread interest throughout the Commonwealth, as well as from the forestry profession at large in the East.

A folding pocket map was published in three colors, showing the location of the entire 1,558,167 acres of State Forests up to July 15, 1930.

A new bulletin now in the hands of the printer is "Pitch Pine in Pennsylvania." The pitch pine bulletin is the result of two years' intensive study of this tree and involved considerable field work throughout the range of this tree in Pennsylvania. Additional records and observations covering studies extending over long periods of years by

the Department were incorporated in the report. Almost 100 sample plots were established in pure and mixed natural stands, as well as plantations. The bulletin will contain 112 pages profusely illustrated and represents the most intensive studies of its kind hitherto made by the Department. It will be the first publication ever devoted to this tree in this country and is an auspicious beginning for a series of tree studies that will follow. Similar tree studies are now under way on the oaks, black locust and black walnut.

The Department's Service Letter, issued weekly, has a mailing list of about 450, and the Fire Warden News, issued quarterly, of more than 4300. News stories are supplied weekly to the Capitol Hill News as well as to the Associated Press, and upon special occasion, to local papers. This does not include local news items, a large number of which have been sent out by the District Foresters during the year.

In August of last year a graduate forester was employed to handle forestry exhibits in the field, and preparations were made to exhibit at the fall fairs. During the last four months of 1929 the exhibit truck has visited four fairs, and in 1930 six fairs and three other exhibitions. Plans are under way for the annual State Farm Products Show, held in Harrisburg in January, at which the Department exhibit was visited by 70,000 persons.

Parks and Recreation.—A survey has been made pertaining to the recreational facilities within the State Parks, the demand for which has constantly increased, until now it is estimated that approximately one and one-half million people annually enjoy the pleasures of these forests.

To safeguard public health, the water supply at all the recreational areas has been examined, and recommendations made by the State Department of Health have been followed. Incinerators have been provided to dispose of rubbish and garbage, additional fireplaces, shelters and comfort conveniences are being provided, and tenting space and parking facilities enlarged.

On several areas a number of log cabins have been erected, and rustic bridges have assisted in the development of park and camp areas along the lines of natural sylvan appearance, in contrast to city park development.

Special attention has been given to and much favorable comment passed upon the development of trails leading to places of unusual interest, such as attractive secluded areas, waterfalls, wild flower glens, big trees, plantations and high points from which to enjoy scenic beauties. Along these trails various species of trees and other interesting natural features have been labeled, much of this

work being contributed by groups of State Park visitors who are interested in the outdoor movement. The identifying and listing of the flora and natural features in Cook Forest Park deserves particular mention. Vistas have been opened to provide otherwise inaccessible views, and improvement cuttings have removed inferior trees, but preserved the native flowering shrubs.

The Game Commission of Pennsylvania now has title to 211,064 acres of forest lands. All but 31,461 acres of this are now known as public hunting grounds. They also have 18,833 acres of privately owned lands leased, and under agreement with the Department of Forest and Waters, 52,292 acres of State Forests are used for game refuge purposes.

The Game Commission maintains:

Thirty-four primary refuges, comprising 75,728 acres, of which 20 are on State Forests, with a combined area of 45,613 acres. Fourteen, totaling 30,115 acres, are on State Game Lands, which were purchased by the Game Commission out of the sportsmen's money.

Two secondary State game refuges, both on State Game Lands, and aggregating 887 acres.

Sixty-nine auxiliary State game refuges are now maintained with a total area of 26,856 acres. Fifteen are on State Forests (totaling 6,679 acres), four on State Game Lands (totaling 1,346 acres), and fifty (with a combined area of 18,833 acres) are located on privately owned lands, for which only the hunting rights are leased by the Game Commission.

The Allegheny National Forest is located on the headwaters of the Allegheny River. Within the next few years it is expected that the total area of this forest will be from 500,000 to 600,000 acres. Of this amount there have been 360,000 acres acquired or approved for purchase, and 40,000 acres under active consideration. There is also under consideration for purchase at the present time an additional 35,000 acres. Wheeler and Dusenbury donated 20 acres of the finest portion of the Hearts Content tract of virgin pine and hemlock. Surrounding this tract the United States Government has acquired 100 acres. The Federated Women's Clubs of Pennsylvania also plan to purchase the Wilkins Farm which immediately adjoins Hearts Content and donate it for recreational purposes.

There has been a total of 25 miles of road constructed and 200 miles maintained on this National Forest.

National Forests.—The 1930 report of the Secretary of Agriculture, just received, states that during the year the area of Federal owned land

within the national forests was increased by 340,297 acres, to a total of 160,090,817 acres. Their use by the public exceeded in various particulars all previous records, with a greater cut of timber, larger total receipts for uses involving a charge, and a greater number of recreation visitors by several million than in the preceding or any other year.

Also on December 3rd the National Forest Reserve Commission approved for purchase a total of 257,081 acres of forest land, located in 27 different units in 16 different States. These areas were obtained at an average cost of \$2.63 per acre.

Two of these tracts, totaling 1,484 acres, are in the State of Pennsylvania.

Although the past year showed a marked decrease in the volume of lumber cut and sold, there was cut from the National Forests a total of 1,655,242,000 board feet, an increase of 10 per cent. over 1929.

Healthful activity in stimulating and forwarding the forestry movement has been contributed by many other forestry associations, by organizations interested in wild life, by educational institutions; also the State Grange, the press, women's clubs, boy scouts and companies and individuals.

The wide publicity given to Spring and Fall Arbor Days and American Forest Week has been helpful in stimulating the interest of both children and parents.

The Summer Meeting was held at Williamsport and Eaglesmere June 26th-28th, and was marked by an unusually large attendance, by a continuous round of hospitality and by numerous opportunities to enjoy the scenic charm of this region. At two evening meetings the talks and papers indicated the interest in the forestry movement and the development of its features.

Those present will remember long the beauties of "Lochabar" and Ricketts Glen, the wooded vistas along Loyalsock Creek, and from Bear Mountain, North Mountain and Red Rock Mountain, and will remember the many and generous courtesies of our hosts at Williamsport, of the Kirk family at Eaglesmere, and of Judge and Mrs. McLean at their summer home.

A year ago this Association had 1,041 members. The past 12 months have taken a heavy toll, and many active workers have been lost to us. The total losses by death and retirement amount to 43, while 49 new members were obtained. The membership today is 1047, and members of the Association are reminded that they will be definite contributors to our effectiveness by obtaining additional friends of forestry to add to our roster. Two years ago more than 400,000 citizens of the

State voted in favor of the proposed forest bond issue. Certainly many of such a large number must be earnest friends of the cause, and you are asked to seek from these so that our number and resulting effectiveness may be increased.

C. P. BIRKINBINE, *Secretary.*

REPORT OF THE U. S. FORESTER

MAJOR ROBERT Y. STUART has issued the report of the Forest Service for the year ending June 30th, 1930. The following excerpts from this excellent report will be of interest to our readers:

The principal contribution of the Federal forest policy to bringing about the best use of the forest resources of the United States has been in connection with national-forest administration. The development of that policy, it is true, took place slowly for some years after the law of 1897 gave it definite direction, nor has it ever been extended to all the Federal lands to which it is in principle suited. With respect to the extent to which the President should make forest reserves the law of 1897 went no further than acceptance of what had already been done and continuance of authority for making more reservations; but it laid down very important governing principles regarding the lands that might be put into these reservations. Forest reservations might be established to "improve and protect the forest" or "for the purpose of securing favorable conditions of water flows" and to furnish "a continuous supply of timber for the use and necessities for citizens of the United States." These three authorized purposes afforded a touchstone for determining what character of public lands Congress designed to have included in the forests.

The time is auspicious for determining the scope of the western national-forest enterprise along more logical lines than have hitherto governed action. Twenty-five years of forest-resource administration by the Forest Service has afforded a demonstration of what can be done under public control to provide harmonized, correlated use of all the resources. The period of experiment and demonstration is over. It is possible to proceed functionally.

There still remains in the hands of the Federal Government a substantial acreage of public lands suitable for national-forest administration for the purposes specified in the law of 1897. There are many millions of acres of timberland in the in-

terior of Alaska which are now almost without protection and seriously ravaged by great fires each year; there are some millions of acres of public-domain timberlands in the continental United States, the future of which is altogether uncertain; there are very extensive areas of public lands requiring controlled use of the vegetative cover to prevent disastrous erosion, flood damage, and water waste. In addition, there are some millions of acres of privately owned timber land within or adjoining the national forests which should be handled as integral parts of the forests under the same management plan, through a blocking-up process now actually under way, though at an inadequate rate, by means of the land exchange authorizations; and there is the prospect of an accumulating area of idle cut-over lands which the owners will not wish to retain and which it would be very bad public policy to leave uncared for and nonproductive. Thus the scope of the general forest undertaking, which for the best interest of the West it will be necessary for some public agency to assume, begins to take on definiteness.

The national forests in the eastern half of the country represent a Federal enterprise distinct from that in the Western States. The western enterprise is based on a policy of public-land reservations in the States where the Federal Government has always owned most of the virgin forest area. The eastern enterprise is based on a policy of recovering from private ownership such limited portions of the vast forest area as peculiarly call for public administration either for the sake of stream-flow regulation or (since the law of 1924 was passed) for timber production. This is true notwithstanding the fact that much of the land in the eastern national forests has come through the reservation of unappropriated remnants of the public domain in a few States.

The total area reported as burned over in the calendar year 1929 on lands protected by the States or the Forest Service was 4,876,000 acres, as against 4,111,000 acres in 1928; and on unprotected areas, 41,354,000 acres, as against 39,431,000 acres in 1928.

Within protected units, 4,876,000 acres were reported as burned over, or 1.22 per cent. of the land. The same percentage applied throughout would have made the area burned by all forest fires 7,196,000 acres, as against the estimated 46,230,000 acres.

In severity the 1929 fire season can be compared only with the seasons of 1910 and 1919. On the whole, the conditions in 1929 are believed to have been more unfavorable than in either of the

two previous record bad years. The three Pacific Coast States, northern Idaho, and western Montana presented the outstanding protective problems.

The fire season of 1930 promises to stand in striking contrast with that of 1929. While the number of fires has been above the normal through the major part of the season, unusually few have been large. This is especially true in the Northern Region (Region 1), where 96 per cent. of the 1,633 fires started up to September 10th were held below 10 acres in size. In the North Pacific Region (Region 6), likewise an unusually large percentage of fires have been held to small areas.

In the Eastern National Forest Region the 1930 season has been unusually severe, with fires during June, July, and August on almost all of the forests. A great many fires were started by lightning on the Ouachita and Ozark Forests, in Arkansas—an unusual thing in the eastern forests.

Including the timber cut in fulfillment of land-exchange agreements, there was cut in the fiscal year 1930 1,655,242,000 board feet, as against 1,502,001,000 board feet in the fiscal year 1929—an increase of about 10 per cent..

The national forests contain over 2,000,000 acres of open, unproductive land that can be restored to productivity within a reasonable time only by tree planting.

On June 30, 1930, 253 water-power permits or easements issued by the Department of Agriculture were outstanding, of which 171 required the payment of an annual rental, while 82 are free permits. Fifty-eight of the rental permits or easements and 60 of the free permits are for power projects, with an estimated average output at minimum discharge of 515,565 horsepower for the rental permits, of 25,970 horsepower for the free. Permits or easements involving transmission lines only included 113 rental, with a length of 929.22 miles of line within the forest boundaries, and 22 free, with a length of 155.40 miles.

The effective and discriminating adaptation of wood to the requirements of specific uses will more and more determine its ability to hold markets under modern conditions of competition; hence there is need for increased knowledge about and care in the selection, seasoning, grading, and handling of the material. New knowledge of the properties of different kinds and grades of lumber was afforded by the analysis of data on the characteristic defects of 13 leading commercial softwoods.

FOREST INSECT INFESTATIONS IN RELATION TO DROUGHT

By J. N. Knull, Forest Research Institute

THE drought which we have experienced throughout Pennsylvania during the past summer undoubtedly will have its effect upon our insect population. Abnormal climatic conditions of this type work in two ways, namely, as a benefit and as a detriment. Summing up the results as a whole, the insect infestations in forest trees caused by a lack of moisture and a high temperature far over-balance any good derived from drought conditions.

It has long been known that climatic conditions play a great part in the abundance of insects. Sudden fluctuations of temperature in the winter kill off large numbers of immature and hibernating forms of insect life, whereas a continuous mild or cold winter will not have the same effect on them. It is also known that solar heat will kill insects in infested logs and branches.

In the past summer there was a vast decrease in the population of the Mexican bean beetle in Pennsylvania due to the drought. Where the adults of this insect were present they congregated in sheltered places on the bean plants to get away from the direct rays of the sun. The eggs which were laid on the under sides of the leaves failed to mature.

Plant lice were extremely scarce during mid-summer, a rather unusual occurrence. The late spring frosts may have played a part in the scarcity of these insects.

The conspicuous absence of the work of the locust leaf miner, except in sun sheltered places is a good example of how drought may affect insects of this type. Other years the black locust was heavily infested by this insect and it was an easy matter to pick out the brown trees on a wooded hillside at a distance. Middleton (1929) reports pine sawflies and other defoliating larvae which were killed by an extensive high temperature of a week's duration in the vicinity of Washington, D. C. The writer observed that many wood boring forms of insects were quite scarce during the past summer and that there was a more rapid decrease of the adults during the late summer than usual. These are a few examples of how a high temperature may work to the detriment of the insects.

On the other hand, drought conditions cause a lessening in the annual growth of trees and in this

way make them more susceptible to insect attack. It is well known that slowly growing trees and trees which have been defoliated and thereby weakened in their annual growth are more susceptible to attack by certain forms of insects, probably through odors produced by the trees. Primary borers will often oviposit in fast growing trees and their progeny will not be able to develop due to the rapid growth. If these same insects were to lay their eggs in trees of a low vitality they would in all likelihood be able to mature to adults. Insects which will normally breed in cut timber will often attack slowly growing trees and kill them.

Felt (1914) and Blackman (1924) showed a direct relation between rainfall and infestation by the hickory bark beetle. Craighead (1925) found that a heavy precipitation while the young broods of the southern pine beetle were developing causes a high mortality of the insects. Heavy infestations of the two-lived chestnut borer have been recorded after severe periods of drought.

A good example of the results of insect infestations caused by the drought in this state were observed in a red pine plantation along Tumbling Run, near Pottsville, in the Weiser Forest District. The trees in the plantation had been making good growth for the past ten years. This year approximately 1500 of them were infested with the pine bark beetle (*Ips pini* Say). The attack was not general throughout the plantation, but was centralized in an irregular area on a hillside, probably underlain with rocks. All of the trees examined will be killed by the borers. The pine bark beetle is one of the many borers which do not cause any injury to healthy, fast growing trees. Infestations of this type can often be prevented by a liberal application of water, thereby causing a more rapid growth of the trees. These infestations would not occur in a year with normal rainfall. Many insects are quite selective, not only as to host plant, but condition of the tree at the time of ovipositing. A tree has to be cut at just the right time of the year, or be in the proper condition to be infested. This condition depends entirely upon the species of insect as well as other factors.

The injury produced by defoliators will be more noticeable on a weakened tree than on a healthy one, although insects of this type seem to show no preference for a sickly individual.

Most of the borers which attack weakened trees had laid their eggs for the 1930 season before the effects of the drought were so marked. The writer is, therefore, of the opinion that forest,

shade and ornamental trees will suffer more from certain forms of wood borers in 1931 than they did in 1930, owing to the fact that many of them have been weakened by drought to such an extent that insects will find them an easy prey next season.

CHAULMOOGRA TREES FOR LEPROSY

CHAULMOOGRA, an Asian tree from which is produced chaulmoogra oil, the most effective remedy for leprosy yet discovered, grows well in Porto Rico, according to William P. Kramer (P. S. F. S. '19) Supervisor of the Luquillo National Forest.

The first chaulmoogra trees were planted by the U. S. Forest Service in Porto Rico a few years ago, in one corner of the small leper colony at Trujillo Alto. The seed was brought from Siam and the East Indian Islands by the Bureau of Plant Industry, and the young trees, says Kramer, have thrived remarkably. They promise to make Porto Rico not only an important nursery center, but also a future source of the healing oil. As much as \$10 each is paid for the seedlings, some of which have been transported by steamer to Caribbean ports and thence inland by airplane.

Although Porto Rico has many valuable native hardwood trees, it is obliged to import most of its building material, largely pine, from the United States. Plantations of Austrian pine are doing well in the Insular Forests. Although a hard pine, it is not nearly so hard as some of the native Porto Rico woods, into some of which an ordinary nail cannot be driven.

Ausubo wood from the Luquillo National Forest, is at present in best demand and brings \$200 per thousand board feet. It is very hard, and needs to be, for it is largely employed in the making of wheels for bullock carts. It is also a valuable construction timber, but too hard and difficult to work in cabinet making.

The Insular Forests are composed of about 20,000 acres of lowlands in Mangrove trees and about 23,000 acres of uplands, where much of the planting is to Austrian pine. The Mangrove lowlands produce fence stakes and fuelwood, largely used for charcoal. In the upland forests the Insular Service is growing fuelwood on seven to ten year rotations. Austrian pine production is about five cords per acre per year. These pines grow fast. Some of them are 30 feet high and four inches in diameter at three years of age.

DEPARTMENT OF FORESTRY
STATE COLLEGE
PA.

FOREST LEAVES

APRIL, 1931



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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 714 Commercial Trust Building, Philadelphia.

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EDITORIALS

GOVERNOR-ELECT GIFFORD PINCHOT on January 13th, announced the appointment of Lewis E. Staley as Secretary of Forests and Waters.

Lewis Emory Staley needs no introduction to the foresters of Pennsylvania, having previously served the Commonwealth in an official forestry capacity for twenty years. Graduated from the Mont Alto State Forest School in 1906, he was in charge of improvement cuttings on the Mont Alto State Forest for several years, and Forester of the Mont Alto Forest from May, 1910 to March, 1920. On March 11, 1920 he was appointed Chief of the Bureau of Operations in the Department, and Deputy Commissioner of Forestry on January 22, 1923. He was Deputy Secretary of Forests and Waters in the reorganized Department from June 15, 1923 to April 16, 1927. Then, after a year in private lumber business, he became the first State Forester of South Carolina, which position he resigned to accept reappointment in his native State. Mr. Staley was born April 24, 1881, at New Baltimore, Franklin County.

In announcing the appointment of Mr. Staley to a place in his Cabinet, the Governor-elect said: "It gives me particular pleasure to make this announcement because Mr. Staley has come up through every grade of the Service to the top during the twenty years of his connection with it. His appointment emphasizes my belief that the Department should be headed by a professional forester. Mr. Staley is acquainted with 99 per cent. of the personnel of the Department and there is no part of its work with which he is not familiar. I welcome him warmly to the new Cabinet."

* * * *

Governor Pinchot on January 22nd, announced the appointment of John W. Keller as Deputy Secretary of Forests and Waters.

John Weiman Keller was born in Mifflintown, Juniata County, in 1887. He attended Susquehanna University and graduated from the Pennsylvania State Forest School at Mont Alto in 1910. His first assignment as a Forester for the State was in Tioga County with headquarters at Lloyd.

Later he was assigned to Centre County with headquarters at Boalsburg. In 1920 he was appointed Chief of the Bureau of Extension in the Department of Forests and Waters, which position he ably filled until 1928, when he became Forester for the State Highway Department in charge of their roadside tree planting program. Under his direction the highways of the State have been beautified to the point where they have become nationally known for their ornamentation in many sections. More than 500,000 trees, shrubs, and vines have been planted on roadside slopes to prevent erosion and snow drifting, as well as to beautify the surroundings.

* * * *

H. A. Smith has been appointed State Forester of South Carolina, succeeding Lewis E. Staley.

State Forester Smith was formerly Assistant State Forester of Florida, having been appointed to that position on August 1, 1928. At the time of his appointment as Assistant State Forester of Florida, he was District Forester of the Weiser Forest District with headquarters at Pottsville, and prior to that was District Forester of the Sinnemahoning Forest District. His many friends in Pennsylvania extend their best wishes with the knowledge that he will fill his present position in the same able and creditable manner that he has filled his former positions.

THE Pennsylvania Forestry Association from the first organization of the Department of Forestry has advocated that trained foresters should be at the head of the Department if it was to function to its fullest efficiency. We fully endorse the selections our Governor has made, and if they are supported by sufficient appropriations, the cause of forestry in Pennsylvania should advance far beyond any administration in the past.

We wish to express our appreciation of the valuable services rendered by the retiring Secretary, Charles E. Dorworth, and Dr. Joseph S. Illick, Deputy Secretary. It has been a pleasure to co-operate the past few years as to the former, and many years as to the latter. Mr. Dorworth has rendered valuable services to the State during his term of office, and in retiring he can in

retrospect look to many improvements and additions made during his administration.

Dr. Illick, with whom our Association has enjoyed a most pleasant contact and co-operation, has surely left behind an imprint on the cause of forestry in Pennsylvania which will be lasting. Through his vision of the future requirements of forestry the Pennsylvania Forest Research Institute was conceived and established whereby the future activities of the Department will be greatly assisted. Once a forester always a forester, our best wishes go with him. He is now Special Lecturer in Silviculture in the New York State College of Forestry, at Syracuse University, Syracuse, N. Y., where he will render valuable services. As a further testimony of our appreciation of his services the Council of the Pennsylvania Forestry Association unanimously passed the following resolution:

Resolved, That the Council of the Pennsylvania Forestry Association expresses appreciation of the services of Joseph S. Illick, to the State and the cause of forestry, and further that it desires to recognize the many years of help and co-operation which he has given us.

PROPOSED FORESTRY LEGISLATION

THE Pennsylvania Forestry Association desires an appropriation of at least one million dollars for the purchase of wild lands for State Forests, and will ask the Appropriation Committees of the Senate and House of Representatives that this sum be allotted in the appropriations bill.

This is the same amount as given by the last Legislature, but is far below the \$4,000,000 to \$5,000,000 that the former administration stated would readily be available, and which was given as the reason for not favoring the bond issue.

Our members and other friends of forestry are requested to use their influence with representatives in the General Assembly to secure enactment of this legislation, and if possible attend the hearing before the joint meeting of the Senate and House Appropriation Committees. The names of the members of these committees are given below:

Members of Senate Appropriation Committee

Harry B. Scott, Chairman	Frank E. Baldwin Morris Einstein
John G. Homsher	George Woodward
Samuel W. Salus	Max Aaron
Clarence J. Buckman	James E. Norton

Thaddeus S. Krause
William D. Mansfield
Richard S. Quigley
William C. Freeman
Frederick T. Gelder
George T. Weingartner
James S. Boyd
James J. Coyne
William H. Earnest
Howard I. Painter
Harry J. Bell
Frank L. Fay
Bertram G. Frazier
Frank J. Harris
Wm. C. Hunsicker
Miles B. Kitts
Chauncey W. Parkinson
Andrew J. Sordoni

Members of House Appropriation Committee

Dr. Jos. G. Steedle, Chairman	John W. Storb
Edward Haws	George W. Weaver
W. Albertson Haines	Ollie J. Powell
William T. Bell	Alexander R. Wheeler
Wm. F. Stadtlander	Benjamin Jones
G. W. Williams	John L. Holmes
James J. Heffernan	Jos. B. Henderson
George H. Soffel	John J. Heffernan
J. A. Rhodes	Joseph R. Lynch
P. M. Myers	Louis Schwartz
Arthur Greenstein	T. J. Brown
Robt. S. Spangler	James T. Heffernan
Frank E. Hoffman	Robert G. Kleckner
James Wettach	Aaron W. Mumford
Martin Memolo	Carl C. Baldrige
T. B. Wilson	Fred W. Patterson
Elder Peelor	Ray W. McKay
Sheppard H. Royle	Mrs. Lillie H. Pitts
C. C. A. Baldi, Jr.	Matthew A. Dunn
Arnold M. Blumberg	J. Llewellyn Meredith
Howard F. Rieder	James Harkins, Jr.
Grover C. Talbot	William J. Munley
E. P. Brown	John M. Flynn
Patrick Conner	Samuel J. Perry

There will be introduced an Act authorizing the submission to voters at the next election of a bond issue for \$15,000,000 for the purpose of acquiring lands for forest and park purposes; and this is approved by the Association. But this will not be available before 1933, if approved by the voters. A legislative appropriation of \$1,000,000, if made, will however be available immediately.

R. W. Williamson
Benjamin Apple
Harvey G. Bowers
Herman P. Brandt
Laning Harvey
John J. McClure
Leon C. Prince
Jos. G. Armstrong, Jr.
Chas. H. Clippinger
John W. Howell
William S. Rial
Joseph C. Trainer
Henry E. Lanius
Herman E. Baumer
Warren R. Roberts
Augustus F. Daix, Jr.,
ex-officio

SPRING ARBOR DAY PROCLAMATION

In the Name and by Authority of the Commonwealth of Pennsylvania, Executive Department, Harrisburg.

PROCLAMATION

I, GIFFORD PINCHOT, Governor of the State of Pennsylvania, do hereby designate and proclaim Friday, April 3, and Friday, April 17, as Arbor Days and Bird Days, to be appropriately observed throughout the Commonwealth by the planting of trees, the study of bird life, and such other exercises as will develop a deeper appreciation and a greater conservation of our trees and birds.

Arbor Day means Tree Day. Trees are the friends of mankind. From time immemorial, they have been intimately associated with man's life. The trees of the forest have fed man, furnished him medicine, sheltered and protected him from his enemies and the elements in all ages and in all climes. At no time more than the present, and in no State more than in Pennsylvania, has the need for the manifold blessings of protected and productive forests been more evident.

Pennsylvania's beauty, industries, agriculture, and streams, are dependent upon trees. The restoration of forest-clad mountain slopes, the establishment of plantations on idle and worn-out farm lands, the planting of trees for shade, beauty, and bird life in communities and along the highways that connect them, are companion problems of conservation that deserve the best thoughts of our citizens.

The two hundredth anniversary of the natal day of George Washington will be celebrated throughout the nation in 1932. In anticipation of this observance, it is urged that schools throughout the State plant commemorative trees on the coming Arbor and Bird Days so that they may be dedicated to the Father of our Country on February 22, 1932.

Arbor Day is also a fitting time to consider the evil consequences of forest fires. The direct damage that fire does to growing timber, the loss of game and other wild life as a result of forest fires, the deterioration and erosion of the soil, the injury to the productive power of the forest, and the destruction of beauty are problems that should challenge the attention of every citizen of the Commonwealth.

I, therefore, urge attention to all these phases of tree and bird life. Let the coming Arbor and Bird Days be given wide constructive observance,

not only by school children and teachers, but by all the people in the Commonwealth.

GIVEN under my hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this ninth day of March, in the year of our Lord, one thousand nine hundred and thirty-one, and of the Commonwealth the one hundred and fifty-fifth.

By the Governor:

GIFFORD PINCHOT.

RICHARD J. BEAMISH,

Secretary of the Commonwealth.

PENNSYLVANIA'S FIRST ARBOR DAY

LATELY, there has been considerable discussion as to when Pennsylvania began in an official way, to celebrate Arbor Day. The generally accepted date was April 22, 1887. A careful review of the history of this important tree day shows that Thursday, April 16, 1885, was the first official Arbor Day in Pennsylvania, and not April 22, 1887.

There follows an extract from the Journal of the State Senate:

In the Senate,
March 16, 1885.

Resolved, By the Senate (if the House of Representatives concur), That the Governor of this Commonwealth be requested to appoint a day to be designated as "Arbor Day" in Pennsylvania, and to recommend, by proclamation to the people, on the day named, the planting of trees and shrubbery in public school grounds and along public highways throughout the State.

Thos. B. Cochran,
Chief Clerk of the Senate.

In the House of Representatives,
March 16, 1885.

The foregoing resolution concurred in.

Geo. Pearson,
Chief Clerk,

House of Representatives.

Approved the 17th day of March, A. D. 1885.

Robt. E. Pattison (Governor).

In the April, 1885, issue of "The School Journal," (Vol. 33, No. 10), of Pennsylvania, appeared Governor Pattison's Arbor Day Proclamation. It follows in full:

In the Name and by the Authority of the Commonwealth of Pennsylvania, Robert E. Pattison, Governor of the said Commonwealth.

ARBOR DAY PROCLAMATION

To aid in the systematic encouragement of tree-planting throughout our various communities; to awaken and cultivate among the young a taste for the study of nature, and some knowledge of the necessity, profit, and delight of agricultural pursuits; to arouse public attention to the necessity of preserving and perpetuating to a proper degree the forests of the State, that we may escape the threatening peril of their wanton destruction, and to carry out the concurrent resolution of the general assembly, approved the 17th day of March A. D. 1885, to-wit:

Resolved, By the Senate (if the House of Representatives concur), that the Governor of the Commonwealth be requested to appoint a day to be designated as Arbor Day in Pennsylvania, and to recommend by proclamation, to the people on the day named, the planting of trees and shrubbery, in public school grounds and along public highways, throughout the State.

I, therefore, do appoint Thursday, the 16th day of April, A. D. 1885, to be observed throughout the State as Arbor Day. And I recommend that the people of the Commonwealth do, on that day, plant trees along the streets, by the roadsides, in parks, and commons, around public buildings, and in waste places; that they distribute information in regard to trees, shrubbery and forests, and that they encourage tree-planting in every way possible.

Given under my hand and the great seal of the Commonwealth this 23rd day of March, in the year of our Lord 1885, and of the Commonwealth the 109th.

Robert E. Pattison, Governor.

By the Governor:

W. S. Stenger,

Secretary of the Commonwealth.

Following the Proclamation appears the following editorial comment in *"The School Journal"*—

"Governor Pattison will probably affix his signature to no public document of greater importance during his term of office. Years hence it will cause us little surprise to know that this brief but comprehensive proclamation shall be regarded by himself as, in its results, the most important State paper of his administration."

"We trust that its suggestions will be universally regarded, and that tens of thousands of trees—both fruit trees and shade trees—will be planted on Arbor Day throughout the length and breadth of Pennsylvania. Let the schools through all their representatives—pupils, teachers, superintendents,

and directors or controllers—take hold of this good work, and make the coming 16th day of April memorable as the first of a long line of Arbor Days which shall succeed it, to the great benefit, we trust, not only of the State in general, but, in particular of every school, in every school district of the Commonwealth."

We know, now, that Thursday, April 16, 1885, was the first official Arbor Day in Pennsylvania!

FIRST ARBOR DAY STATEMENT OF STATE SUPERINTENDENT OF PUBLIC INSTRUCTION

Under date of March 31, 1885, Prof. E. E. Higbee, State Superintendent of Public Instruction, issued the following Arbor Day statement:

"Department of Public Instruction,
Harrisburg, March 31, 1885.

"Dear Sir:

"You are hereby most urgently requested to make every effort possible to have the schools under your jurisdiction worthily observe 'Arbor Day,' the proclamation of which is herein enclosed.

"In anticipation of such proclamation, *The Pennsylvania School Journal* has, during the current volume, devoted considerable space to the matter of tree-planting. The issues for March and April, the latter now on press, will be found very suggestive in this direction, and to these numbers superintendents, teachers, and school directors are referred.

"Select mainly such trees for planting on school grounds as grow well in your immediate vicinity—hickory, walnut, sweet-gum, dog-wood, button-wood, ash, bass-wood or linden, birch, beech, locust, willows, tulip-tree, pines, larches, firs, and others too numerous to mention. For shrubbery and vines—mock-orange, spireas, the burning bush, deutzia, lilacs, weigela, hardy roses, honeysuckles, Virginia creeper, wisteria, the tecoma, and others, which will give variety, and greatly increase the attractiveness of the school-building and its surroundings of grass-plat and greenery.

"As to the exercises of Arbor Day, these may be quite informal, if that shall seem best—the essential purpose being the planting of trees, shrubs, and vines. But it will be eminently proper, where arrangements can readily be made for a formal programme, to make this also a prominent feature. The reading of a selection from the Bible, prayer by a clergyman of the neighborhood, readings, reci-

tations and songs by the pupils, an address by the teacher or other citizen of the district interested in the work of the day, will afford variety, and serve to render the occasion more interesting and impressive.

"Let every teacher organize his school for the work, and in consultation with the directors, have the grounds properly prepared, and holes ready for trees, and shrubs, and flowers, and vines. Solicit the cooperation of the whole neighborhood. Should the day appointed prove inclement and unfit for the work, postpone it until the following Saturday. How you may be best able to communicate instructions to all your teachers, must be left to your own good judgment. We would suggest the use of the local press as far as possible. As the intervening time is brief, great promptness will be required.

"You will also please make special report to the Department of Public Instruction, in the latter part of May, after the planting season has passed, as to the probable number of trees planted in your jurisdiction upon Arbor Day and thereafter, as a result of this effort to arouse and extend popular interest in the planting of trees and the ornamentation of school grounds."

Very respectfully,

E. E. Higbee,

Supt. Public Instruction.

WHEN ARBOR DAY BEGAN

The official father of Arbor Day was J. Sterling Morton, a member of the Nebraska State Board of Agriculture, and afterwards Secretary of Agriculture under President Cleveland. In 1872 he offered a resolution setting apart April 10th of that year as "tree-planting day." The resolution was finally adopted after some discussions in which the designation "Sylvan Day" was also suggested. A prize of \$100 was offered to the agricultural society of that county which should plant properly the largest number of trees, and to the person planting the largest number of trees a farm library worth \$25 was offered. There was such a generous response to the tree planting appeal that more than one million trees were planted throughout Nebraska on the first Arbor Day. In 1873 Arbor Day was observed in Nebraska with increased interest, and in 1874 the Governor officially proclaimed the second Wednesday of April as Arbor Day for Nebraska.

Reservoirs in the State of Idaho are endangered by silt which follows range control.

REFORESTATION BY MACHINERY

By Research Forester George S. Perry

WHEN the Society of American Foresters held its recent annual meeting in Washington, D. C., much interest was aroused by an exhibit and demonstration of two machines for forest tree planting and soil cultivation. The tendency of the age, in every field, is for man to sit on a cushioned seat and do his day's work by pulling levers and pushing buttons, or making a few easy and simple movements. This trend appeals to foresters as well as engineers in other lines of work.

In Europe it has long been customary in certain localities to cultivate the forest soil by hand labor when the time arrives to establish a new tree crop on areas where old timber is to be cut. This makes it much easier for seeds to germinate, to resist the heat of summer, and to compete with undesirable weed plants. Such work has often been done of late years by horse or tractor drawn implements.

There is no reason in America why great combination caterpillar tank reforesting machines should not be developed and used so at one operation the soil might be cultivated, worthless shrubs and forest weeds uprooted and eliminated, and seeds or seedlings for a new and desirable tree crop planted under most favorable conditions.

Foresters and forest lovers in Sweden were recently surprised by the following press item in the news of that country:

"Forest Tree Seeds in Soil Briquettes,"

New Epoch-making Method—if it works.

A corporation, "International Planting Method," has been formed in Oslo, Norway, for exploiting an invention whereby an automatic machine makes soil briquettes in which spruce or pine seeds are imbedded. The seeds may be stored in the briquettes as long as desired. When they are exposed, however, under proper conditions as to moisture, light and air, the seeds develop into little trees in two or three weeks. The briquettes contain sufficient plant food in most favorable form to support the trees for a year, which makes it possible to plant them at any and all seasons, except when the ground is frozen hard. This is a great advantage, since naked rooted trees now used in forest planting can only be set out with uniformly good results during the spring. The briquettes give the young trees in addition a better chance of survival and assure development of a normal root sys-

tem in contrast to trees planted by ordinary methods.

"The speed of forest planting by the above method is so greatly increased that it seems possible to completely reforest in a few years all the waste lands of Norway left as a heritage from centuries of robber cutting and wanton forest destruction. The briquettes cost \$2.65 to \$2.70 per thousand, while naked rooted seedlings grown in nurseries cost from \$4.00 to \$5.40 per thousand. It is quite possible to use other seeds than pine and spruce in the briquettes."

The above news note aroused considerable skepticism in forestry circles, hence the forestry journal, *Skogen*, started an investigation. It found that the new method was based on and derived from a well-known procedure that had gained some local popularity in Norway, whereby two or three tree seeds are put into balls of peat compost by hand and then stored for planting out in the field when conditions were favorable. This method gave steady employment to laborers regardless of weather and guaranteed that each tree would germinate and get its first year's start under most desirable soil conditions. Engineers were consulted on the subject and a Norwegian inventor, B. Holm-Hansen finally designed the present machine which was made in a German shop and assembled recently in Norway.

Trials of the machine demonstrate that it will make 16,000 planting briquettes in an eight-hour day, and that even greater outputs can be expected.

The machine works with carefully prepared peat compost as raw material. Plant food content, acidity and moisture are carefully controlled in preparing this compost. The briquettes are formed and seeds properly implanted therein automatically, then the pressed lump is dipped into a warm paraffin-wax compound which holds it together. The machine does all this and even packs the completed product in large baskets suitable for storage and transportation to the planter.

The ease of planting the briquettes and the fact that they are large enough to feed the tree roots for a year, are very real advantages of this reforestation method.

The company behind this machine has a capital of \$135,000 and expects to introduce the new method of forestation soon in England and other countries.

Two prominent Norwegian foresters who have watched the development closely were interviewed. The first said, "If the method does what it promises, it will revolutionize reforestation activities.

I have personally full and firm faith in it." The second said he considered the method entirely practical and beyond the experimental stage.

There are ideas in the foregoing recital that should stimulate study and emulation in America, where reforestation is one of our greatest national needs.

PINE NEEDLES AND OAK LEAVES

By Prof. George S. Perry

HOW many leaves are on an acre of forest? Such a question makes one think of asking how many stars are in the sky, or how many drops of water and grains of sand "make the mighty ocean and beauteous land." All these questions may seem equally foolish and irrelevant to the world of every day things, yet now when scientists weigh and measure the atom or subject protons to numerous searching tests, the folly and jokes of today may become the awe-inspiring wisdom of tomorrow, and possibly also *vice versa*.

In order to unravel and secure a clear grasp of the natural laws that limit and account for the growth and life history of forest trees, investigators at the Pennsylvania Forest Research Institute at Mont Alto have recently completed careful studies of the foliage of certain trees as they occur under forest conditions.

Oak forests were first studied. The trees on a densely covered acre of such woodland were found to carry from three and one-half to six and one-half tons of leaves at the end of growth in late summer, depending upon the fertility and moisture conditions of the soil. If all these leaves were laid out flat and edge to edge, without overlapping or failing to meet, they would cover an area of from five to six acres. Since all such leaves have a green surface below as well as above, an acre of oak forest may be said to expose, or present to the light, about 11 acres of green leaf surface.

White pine forests do considerably better than oak, and moreover hold their needles throughout the year. A young stand of these trees studied in January had 484,522,536 needles per acre with a green weight of almost seven tons (13,909 pounds). If all these needles were laid end to end they would reach nearly around the world, or a total distance of 24,030 miles. The green surface exposed by the needles from an acre of white pine had a total area of more than 19 acres (19.172 A.).

Pitch pine, commonly but incorrectly called jack pine, offers a sharp contrast to the other pines discussed here. A comparison shows one reason

why this tree is better fitted to resist drought years and can grow on drier soils than any other common tree of Pennsylvania. An acre of pitch pine forest in winter carries only about 63,000,000 needles with a total weight of less than two and one-half tons (4,820 pounds) in the green condition. These needles expose only about seven and one-half acres of surface (7.64 A.), which is not even as good as oak does. Although it might be said in extenuation of this pine, that if needle counts and measurements were made about September first instead of in winter, it would likely carry 12 or 13 acres of foliage surface per acre of soil area, as it sheds almost half its needles each autumn, while white pine sheds about a third, and red pine less than one-fourth.

Red pine surpasses in luxuriance of foliage all native trees yet studied, although it bears only 355,700,000 needles per acre of forest in winter, and is exceeded by white pine in mere numbers as well as total length of needles. The green foliage from an acre of these trees in January weighs almost nineteen tons (37,820 pounds). The combined length of all the needles is a little more than 21 miles, while their total green surface exposed is more than twenty acres (20.17 A.) per acre of forest.

Sunlight is the power and green leaf surface is the window through which it reacts upon the miracle working chlorophyll machinery of photosynthesis, best measurer by weight of the green foliage. Such facts as the foregoing help man toward an appreciation of the stupendous and marvelous alchemy of nature, which transmutes a little base earth, some unstable water, and a relatively vast volume of imperceptible carbon dioxide gas, into substantial wood, one of the most useful and versatile servants a gracious and all-wise God has ever lavished on thoughtless mankind.

George Washington, the Father of our Country, was an enthusiastic tree planter. That he had his own troubles in transplanting forest trees is evidenced from excerpts from his diary, as follows:

May 7, 1760—Most of my transplanted trees have a sickly look. The pines are entirely dead, the hemlocks almost dead, and so are the oaks. A single ash tree has unfolded its buds.

July 22, 1760—The leaves of the honey locust began to fade and many of the trees died. The black gum trees looked well at first, but now all are dead. So are the poplars and mulberries. The papaw are partly dead and many of the pines, cedars, and hemlocks entirely dead.

FREDERICK THE GREAT'S FOREST FIRE PENALTIES

STARTING a forest fire in the days of Frederick the Great meant a heavy fine or jail sentence for some one, according to historical data recently reviewed by the Forest Service of the United States Department of Agriculture.

American foresters have long deplored the general public disregard of forest values, the indifference to damage by fire or promiscuous cutting, but they have never urged the infliction of severe penalties upon persons guilty of such damage. It is sometimes felt, however, that the penalty imposed in a particular case is a heavy one. By contrast with the earlier laws of countries where the vital relationship of forest to public welfare was first recognized, present-day penalties for violations of forestry laws in this country are mild.

Excerpts from a proclamation of King Frederick, Berlin, December 3, 1775, show some of the severities in his forest laws for East Prussia:

"Anyone starting a fire in or within 100 paces of a forest, or using a pitch torch or any fire when fishing or catching crawfish in any lakes within and on streams or creeks flowing through a forest, or who smokes tobacco during the dry or summer season within a forest, even though no damage is done, shall be punished with a 4-week jail or penitentiary sentence, and, if any damage results, shall pay such damage; if he can not pay the damage, the period of imprisonment shall be in proportion to the amount of damage ascertained, up to 100 thaler (\$75) one-fourth year; from 100 to 200 thaler (\$75 to \$150), one-half year; and 200 thaler and over, 1 year imprisonment.

"Any person wilfully or maliciously starting a fire in a forest, with intent of damage such forest, shall be punished with a 10-year penitentiary sentence at hard labor, and upon establishing the moral responsibility the sentence may be increased even to a death penalty. Anyone discovering and reporting such evildoer shall receive a reward of 50 thaler."

The present-day attitude of Germany toward forest fires is indicated in the trial, reported by the *Deutsche Forstzeitung*, of a 15-year old boy who carelessly started a fire that burned several thousand acres. Because of his youth, he was sentenced to only three weeks in jail. In addition, however, he must report to the State forester at the beginning of each planting season, from 1929 to 1931, and must work without pay during the entire season.

FORESTRY NOTES FROM THE POCONOS

By Egbert S. Cary

THE Pocono Mountains in northeastern Pennsylvania, with an altitude of some 2000 feet and with fauna and flora in general characteristic of the Adirondacks and southern Canada, seem almost a portion of those northern areas sliced off by the great glacier advance and pushed before the ice mass to this, the approximate limit of its invasion.

Covered by vast forests of pine, spruce and hemlock prior to the Civil War, the Poconos were, shortly thereafter, invaded by lumbermen with the wasteful cutting typical of that period, followed in due course by slash fires which spread to the remaining stands of pure conifers.

The generally shallow soil of the uplands, robbed of its humus by fire, offered no inducement to farmers, so fire succeeded fire over thousands of acres until even the pitch pine retired, leaving the field in sole possession of the scrub oak.

However, in sheltered valleys, in the large swamp areas, and in many other sections where, for one reason or another, the fire demon has been exorcised, nature has given a marvelous exhibition of her healing and recuperative powers to hearten forest lovers and to awaken the most somnolent communities to the good results of fire protection and to some sense of their civic duties in the matter.

The waning of lumbering witnessed the rise of the ice harvesting throughout the plateau whose gently rolling surface, cheap land and abundant water supply meet all requirements for the construction of shallow artificial lakes of large area, while the altitude insures weather conditions that, in practice, have never failed to produce crops of merchantable ice. In the earlier days the ice harvest furnished employment to great numbers of men and teams for a period of six weeks or more, but modern mechanical equipment has reduced both the number of men employed and the term of employment to a fraction of the former figures.

The Pocono Forestry Association, originally the Pocono Fire Protective Association, has played no minor part in bringing about this public recognition of conservative principles.

Throughout the district, huckleberries in great quantity appear on burned over areas and for many years the success or failure of the crop was a matter of grave concern to the native population. "Huckleberry fires" were looked upon as a necessary evil and raged without opposition save when

they menaced homes and villages. Blueberries are still an important crop in the Poconos, but the pickers are largely foreigners, the natives having regular employment connected with the summer resorts, and fires, owing to the change in public sentiment, are fewer and much better controlled. Under the auspices of the Pocono Forestry Association test plantings of the new giant blueberries have been made on the plateau in the hope of demonstrating that intensive planting of high grade stock, properly cared for, is more profitable than great areas of scattered wild stock.

The labor problem of the mountain, and to a less extent of the whole region, is seasonal. The summer resorts require, in addition to the migratory type of hotel help, good numbers of laborers and skilled workmen from the local population. Few of these are needed for more than six or eight months of the year and the problem of finding other employment for the remainder of the year is pressing upon the communities and, unless solved, must soon be faced by the resort managements if they are to hold their forces. If but a fraction of the Pocono's cut-over lands had been protected from fire there would, by now, have been ample supplies of second-growth timber to maintain wood-working industries to meet this need for winter employment.

An interesting large-area demonstration of the results following fire protection is furnished by the Pocono Lake Preserve, located in the heart of the plateau. The name belongs primarily to the corporation, a club of that name, but it also attaches to the tract owned by the club.

Lying on both sides of Tobyhanna Creek, a main log-running stream of the lumbering days, it was among the first woodlands to be cleared and immediately became pastureland for oxen and cows attached to the lumber camps. As is always the case under such conditions, the new forest growth started in small clumps on the poorer and less accessible ground where the quality and quantity of the grass did not attract the stock. As tree growth gained momentum and as the falling off of the lumber industry limited the stock requiring pasturage, the forest rapidly took possession of the richer ground.

This succession may be seen in process of development on the adjoining pastureland of George E. Wagner—he of note in forestry circles for his "coppicing" of spruce Christmas trees—and the age variations through the Preserve woodlands demonstrate the succeeding stages in this life history of the forest.

The Preserve, of some 3500 acres, is held in



HEMLOCKS ON POCONO MOUNTAINS, MONROE COUNTY, PA.



LOOKING DOWN TOBYHANNA CREEK, MONROE COUNTY, PA.



WHITE PINES ALONG SHORE OF POCONO LAKE



VIEW ALONG TOBYHANNA CREEK, SHOWING FOREST GROWTH



HEMLOCKS ON POCONO MOUNTAINS, MONROE COUNTY, PA.



LOOKING DOWN TOBYHANNA CREEK, MONROE COUNTY, PA.



WHITE PINES ALONG SHORE OF POCONO LAKE



VIEW ALONG TOBYHANNA CREEK, SHOWING FOREST GROWTH

joint ownership by the 120 members, each of whom has, in addition, a perpetual leasehold of a lot approximating three acres in extent. Of the 3500 acres, the lake covers about 900, building lots about 400 and something over 2000 is classed as forest land.

A shoreline strip averaging about 150 feet in width is reserved for a roadway around the lake and serves to insure control of forestry and landscape cutting on the lake edge. In general, the theory of shoreline trimming retains a fringe of shrubbery at the water's edge so that, from the lake, evidences of civilization are minimized, yet a reasonable latitude in thinning dense growths and in cutting vistas permits outlook on the lake from roadway and cottages.

The Preserve forest is of the typical beech-birch-maple type, but the many interesting variations present a constantly changing aspect as one tramps the woodland trails, and in some sections conifers are really the dominant trees. A common type is beech-birch-maple in the 60-70 foot height class with a dense undergrowth of hemlock ranging up to 25 feet in height and fairly shrieking for release.

Throughout the tract the wandering eye is constantly arrested by splendid examples of black cherry, often a dozen or more to the acre, with clean, straight boles from 18 to 24 inches in diameter. This species is a rapid grower of good, clear hardwood lumber and its vigorous seedlings are found by the thousand through the woods and give promise of "grading up" the forest type.

Many neighboring woodlands have good stands of oak but comparatively little is found on the Preserve. Although the tract lies in a chestnut region, this species was a rarity in the forest before the blight reached the mountain. The ash is far from frequent but is found scattered through certain sections of the woods.

At frequent intervals the artistic eye rests with joy on great specimen pines or hemlocks, open grown as previously explained and towering above the level of the general forest canopy. The shade-tolerant children of the hemlocks are probably clustered at the bases of their progenitors, but the regal pines seem doomed to die in lonely majesty unless the axe is vigorously wielded among the smothering herd of hardwoods at their feet.

Joining with the great pines and hemlocks on guard duty above the forest level are found numbers of giant hard maples. Straight, free from limbs to unusual heights and with diameters ranging up to four feet, they are a treat to the layman's eye, but the forester suffers a lack of en-

thusiasm. These trees have long been on the down grade, are usually hollow for the greater part of their length and the dense shade of their wide spread branches chokes out all other growth.

One point that never fails to bring comment from visiting foresters is the splendid natural regeneration of the more valuable species. Nature has been aided to some extent by plantings of white and red pine, spruce and Japanese larch, but it hardly seems reasonable to devote effort to such aid while hundreds of acres of forest await proper attention. Incidentally, the ravages of the deer in newly planted tracts are most discouraging.

Even the sections designated as "old burn" are not without interest for, as their aspen-fire cherry type approaches an age of thirty years, one finds a surprising number of the more valuable deciduous trees scattered through the thicket, now past its worst phase as a fire menace, and the accumulation of duff, which is the contribution of these otherwise worthless trees, nourishes not a few young conifers.

To the south of the Preserve lie vast acres of scrub brush, the huckleberry tracts, and from this direction comes the greatest fire danger. Along this border a fireline is inexpensively maintained in good tilth by the use of a tractor-drawn double disc harrow. Last summer a beginning was made toward developing the many woods roads that traverse the forest into a system of secondary lines for fire defense. These old roads, dating from the lumbering days, are very stony and largely overgrown with brush, but after the worst stones are removed an exceptionally heavy disc harrow does astonishing work in chewing up sod and smaller brush, leaving the road in condition to be finished and maintained by the lighter double-disc harrow used in ordinary farm cultivation. The preparation of these fire lines costs about \$250 per mile. As may be expected, they make excellent bridle paths!

Only two fires have seriously threatened the forest in the last twenty years and in each case public spirited neighbors were on the fire front before the Preserve forces could be mobilized to meet the invader.

A first step toward working out a definite forest policy was the bringing of Professor J. A. Cope, of the Forestry Department of Cornell University, to the Preserve in the summer of 1925 to begin a timber survey of the woodlands. This was completed during the following summer.

The survey included a 10 per cent count of all trees 6 inches or more in diameter, together with full notes of forest conditions and treatments ad-

vised for the several sections of the tract. These notes with the resultant type map are the basis of a program that looks toward a possible annual improvement cut of some 100 acres per year, covering the tract in twenty years, at the expiration of which period the forest should be ready for selective cutting of mature and valuable timber at about the same rate of cutting.

Intensive studies were also made of present conditions, rates of growth and natural regeneration on several typical quarter-acre tracts, and on one sample acre every imperfect and weed tree was removed in order that the results of such radical thinning might be studied in coming years. However, haphazard earlier cuttings for dock timbers and other products had provided many areas where such studies could be and were made.

As might be expected from the description of the Preserve, at one place or another is found practically every accepted reason for improvement cutting, but this thinning must be governed by the park purpose of the tract and guided somewhat by landscaping principles, nor must it be so radical that briars and ferns will smother out the young seedlings.

Naturally, before plunging into cutting on the large scale described, the financial phase had to be carefully considered and for this reason the operations of the first three years have been rather tentative and experimental.

A summary of general opinion in the region indicates a very narrow margin of profit in clear cutting of hardwood tracts and finds entire skepticism as to any possibility of an "even break" on such a culling operation as proposed at the Preserve. A study of all factors, however, brings out many favorable points not considered or not understood by the skeptics, among which may be listed:

1. An ample labor supply available during the winter months to supplement the Preserve's well organized force, many of whom are oldtime woodsmen of skill and experience.

2. The ability to furnish employment throughout the year places the Preserve in a strategic position in the labor market.

3. Any necessary investment in equipment is for the life of such material, since the operation is to be continuous, and need not be charged off to a particular short-term job.

4. Much of the required equipment is already owned by the Preserve and is necessary for the maintenance of the grounds. This applies particularly to tractors and trucks which, in their other-

wise short-season use, depreciate more rapidly than they deteriorate.

5. The tract is located within easy trucking distance of the mine region with its market for props and other mine timber.

6. A summer colony provides a market for much firewood and rough lumber.

7. The woodlands are, in general, open and nearly level, accessible on short hauls over woods roads already in existence to centrally located yarding spaces.

8. The timber is of more than average length for this section and is free from limbs to good heights.

9. While in every way desirable and expected, an actual cash profit is not absolutely essential. The improvement of the forest and the holding together of the Preserve's force of workmen may well be placed on the credit side of the ledger.

10. Finally, this woods work may be considered the Preserve's contribution toward solving the seasonal employment problem.

Against these advantages will be found a few opposing conditions:

1. Being a culling operation, the greater part of the trees are imperfect and are subject to much wasteful "butting."

2. More than usual care must be exercised in felling.

3. All tops must be "lopped" down to 2 inches.

4. In many parts of the Preserve a large proportion of the trees marked for removal are beech and the collieries object to much of it.

5. The large diameter of much of the timber is a decided handicap. It is unduly expensive to handle and there is little market for props over 12 inches in diameter. Prices for mine ties, rail and planks do not offer much encouragement to sawing this oversize material, although the Preserve has a fully equipped sawmill.

6. Work connected with the activities of the Preserve as a summer colony must of necessity take precedence over lumbering and this frequently interrupts the orderly progress of woods work.

The purpose of the experimental lumbering of the last few years has been to determine accurately the costs of the various steps and to decide between alternative methods when such appear.

While many of the test operations ended with a loss, the sum total of the small-scale cuttings of recent years gives encouragement to widen their scope, to build up the organization and equipment as further experience proves advisable and to hope that ultimately the goal set by the foresters will be reached.

FORESTS AND WILD LIFE

By W. Gard Conklin, Chief, Bureau of Refuges and Lands, Game Commission of Pennsylvania

IT is worthy of note that foresters of this country are rapidly awakening to the existence of a direct and valuable relationship between wild life and the forests, and that certain forms of wild life are distinctly helpful in the production of timber. That each is beneficial to the other is apparent in many ways when the subject is given thought. Most foresters heretofore readily admitted that certain species of wild life, particularly game and fur bearers, constituted an economic asset to forest territory, but were loath to admit that timber production was in any way affected by the existence of animal life. Conditions are changing. They are now beginning to recognize the fallacy of their previous attitude and realize that many forms of animal life are aids to reforestation. Their interest is evidenced in several ways. At almost any forestry conference now held one or more phases of the relationship is brought up for discussion. The National Government is appropriating fairly large sums for research to determine how and to what extent the relationship exists. Several forestry schools have created fellowships for the purpose of studying the relation of wild life to forest environments. Forest zoology has become an important subject within the curriculum of several forestry schools, and game management in its application to forest territory is discussed. Even now many foresters are planning for the production of a game crop along with plans for the production of a timber crop.

How timber production is benefited by the existence of wild life is not easily recognized, although apparent when consideration is given to the immense numbers of tree destructive insects devoured annually by birds; that pollen is carried from flower to flower by bees and birds, thus aiding fertilization and resulting in a larger crop of nuts and seeds; that germination of certain tree seeds is largely dependent on passage of those seeds through the digestive organs of birds; and that many trees owe their existence to nuts planted by rodents.

Squirrels have been condemned for carrying off too large a percentage of acorns or hickory nuts under the mistaken impression that reproduction of the forest suffers, whereas these little creatures

are but following one of nature's methods of reforestation. They do carry away almost unbelievable quantities of nuts, presumably for winter use, and as a matter of fact they select the best, not those infested with worms. But what is done with these nuts? A few certainly are carried to nests for immediate use, but by far the largest proportion are buried in the ground. Gray and fox squirrels and chipmunks never store quantities of food in any one place; instead, they bury the nuts singly, 1 inch or so in the ground, scattering them promiscuously over rather sizable areas. The red squirrel, to the contrary, collects his food in a large cache. Some of the nuts stored or planted in single caches, probably a comparatively small proportion, are later recovered for food, but assuredly a large proportion remain in the ground untouched. Having been carefully planted, a reasonable number can be expected to germinate and ultimately produce trees. It is safe to assume that a larger percentage germinate when planted by squirrels than would have germinated had they remained untouched under the parent tree. Instead of condemning the gray squirrel or the fox squirrel or the chipmunk, they should be commended for the good work they do in reforestation. They are nature's little foresters and materially aid in the ultimate production of timber.

JOHN EVELYN, in his "Silva, or a Discourse of Forest Trees," published in London in 1664, lists several laws enacted for the preservation of forests. "If any one set Fire of a Wood, he shall be punished and besides pay three Pounds; and for those who clandestinely cut Wood (of which the very Sound of the Ax shall be sufficient Conviction) for every Tree he shall be mulcted thirty Shillings. A Tree so fell'd, under whose Shadow thirty Hogs can stand, shall be mulcted at three Pounds."

The Talmud tells us that the trees trembled when iron was invented, but the iron said: "Why fear me? I cannot harm you unless you join me—it is the wooden handles in the iron axes which enables me to destroy you."

To Marye, my well beloved wyfe, I give power and libertye to lopp and toppe for her fyrewood all trees groweing and standing in the Common Wood of East Burnham—Thomas Eyre, 1644.

UNIQUE HEMLOCK TREES

IN a recent article in the *Montrose Independent*, written by George V. Larrabee on "Traces of Indians," he states that in Gibson Township, Susquehanna County, near Gilett, stood a mammoth hemlock tree with a bushy top, due to its being grafted with a black spruce. He cites another such grafted hemlock which was located eight miles from Gilett in North Jackson Township near Drinker Creek. These trees were used as land marks by the Indians on the main trail to the Oquaga Council House.

Mr. Eugene F. Brundage, of Hop Bottom, Susquehanna County, states in a dispatch to the *Montrose Independent*, that he had a similar hemlock tree grafted to a black spruce on his farm in Lenox Township. This tree died about four years ago, but is still standing, as Mr. Brundage never cared to cut it down. The tree was rather small in size and had not grown much in the last 45 years. Mr. Brundage states that he first heard of this tree when a small boy living in Gibson Township. When a few years later he moved to Lenox Township on an adjoining farm, this tree was a great curiosity. Some of the older residents stated that occasionally Indians would come to look at the tree and disappear without any one knowing where they came from.

On the farm of Mr. Brundage it was quite common to plow out a great many arrow heads, most of which were found within about 200 rods of the tree. He has in his possession a stone Indian relic which is four inches long, triangular in shape, and flat at the bottom. The ends are pointed with a hole in each end. The relic has strange carvings upon it which Mr. Brundage says remind him of pictures of Indian writings that he used to see as a boy in the old Barnes history then used in the public schools.

A giant cypress tree at New Bern, N. C., under which Governor Richard D. Spaight, of North Carolina met Gen. Nathaniel Greene in 1781, and pledged his personal means and the resources of his State to the Continental Army, has been saved from destruction by a delicate operation. It was recently discovered that ants had bored their way into the heart of this historic tree. The decay has been removed and the cavity sterilized so that the life of the tree will be considerably prolonged.

Farmers who own timberland usually get better prices for their timber by selling it as sawlogs rather than as standing timber.

NEW MACHINE ELIMINATES MUCH LABOR FROM FOREST PLANTING

AS many as 2,500 trees can be planted in an hour by the use of the duplex reforesting machine developed by H. R. Walling, of the Champion Sheet Metal Co. (Inc.), Cortland, N. Y., the New York Conservation Department reports. The machine is drawn by a tractor, and its operation requires two men in addition to the driver. A fourth man serves as relief operator and replenishes the machine with trees. (Approximately 6,000 3-year transplants can be carried on the machine.) By the use of the "simplex" type of the same machine, which is drawn by horses and is operated by one man in addition to the driver, it is possible to plant 1,500 trees per hour. With a simplex machine the department planted 75,000 trees on the Brookfield reforestation area last spring at a cost (including a \$50 transportation charge) of \$3.36 per 1,000 trees, which is about one-third as much as it would have cost to plant the area by hand. With the duplex machine, it is estimated, large-scale plantings can be carried out at a cost of \$2 per 1,000 trees. The department has provided itself with one simplex and two duplex machines.

The duplex machine cuts two furrows, 6 feet apart, by means of a pair of shoe-shaped plows which are attached to the sides of a low platform. Before each plow runs a steel coulter wheel which cuts the sod. In the vertical shank attaching each plow to the platform is a wide slot extending to the sole of the plow. On the front of the platform, before the seats for the planters, are several steel rings in which pails of trees are set. Back of these are small, shallow troughs containing water, in which trees taken from the pails are placed in readiness for planting. As the machine moves over the ground a trailing wheel provided with a commutator rings a bell at intervals of 6 feet. At this signal each planter passes a tree through the slot in the plow next which he is seated, holding it until it assumes an upright position in the ground. Two tamping wheels, the treads of which slant slightly inward, almost instantly pass on either side of the tree, and these are at once followed by a large tamping or packing wheel with divided tread. By taking care to grasp each tree at the point where the stem emerged from the soil of the seed bed the planters can obtain the desired planting depth.

The machine is supported on its hind wheels. In the front wheels the axle is located at some

distance from the center, so that the wheels simply drag until the plow encounters an obstruction. The front wheels are then so thrown as to lift the front end of the apparatus and bring the plows practically out of the ground. As an additional safeguard against jamming on rough ground, the coupling of the tractor is made with a spring so that when the strain goes beyond a certain point the machine is automatically released. These features and the strong construction of the machine are said by the makers to permit its successful use on extremely rough areas and areas having a heavy brush cover.

The machine is adapted to planting trees of various sizes, from 1-year seedlings to 4-year transplants.

In a September 12th report on its experience with this reforesting machine the New York Conservation Department stated that a recent check of the trees planted with the machine last spring indicated results comparing favorably with those usually obtained by hand planting.

STORY OF TREE RINGS COMPLICATED BY DROUGHT

THE time-honored method of telling the age of trees by the annual rings has been upset to some extent last year by the peculiarity of the season, says the Forest Service of the United States Department of Agriculture. Trees in most sections got off to a good start in the spring but were halted by the parching summer drought. Almost everywhere the growth of trees this year has been slight, but in some areas where late summer rains soaked the earth, a second period of growth followed the drought, and so altered the ring records. This has been the case in Alabama, according to reports from the State forester.

When a tree puts on a year's growth it adds a new ring of wood, and the diameter increases by double the thickness of the last tree ring. The age of a tree can therefore usually be told by counting the rings on the stump. As a consequence of the halting and the new advance in growth last season, Alabama trees in many cases put on a second thin layer, known to foresters as a "false ring." So the foresters of future years will have to be on their guard in computing the ages in the living calendars of Alabama tree stumps. Such false rings are not uncommon over long periods of years.

Last year's regular ring in most parts of the country shows much less thickness than the average year's ring, and even in those regions where growth was renewed late in the season the second ring has not resulted in a larger total year's growth. Most regions, however, did not get rain early enough to start the second ring.

A CALIFORNIA REDWOOD TREE

FORMER State Forester Joseph S. Illick, on his return from Portland, Oregon, where he represented the Department at the annual meeting of the Association of State Foresters, took a trip through some of the forests of the Pacific Coast and British Columbia. Enroute he saw an interesting record of a California redwood tree on the back of a menu card. Of further interest is the fact that Hon. N. P. Wheeler, a member of the State Forest Commission, is associated with the Little River Redwood Company, on whose land the big tree is still standing.

Total height 308 ft.

Diameter, 5 ft. above ground:

With bark 20 ft. 0 in.

Without bark 18 ft. 2 in.

When cut it will produce 361,366 feet of lumber from the following logs:

	Diameter		Board Measure
	Feet	Inches	
1st log	17	10	34,347
2nd "	17	6	33,075
3rd "	17	2	31,827
4th "	16	10	30,603
5th "	16	6	29,403
6th "	16	2	28,227
7th "	15	10	27,075
8th "	15	4	25,392
9th "	14	10	23,763
10th "	14	4	22,188
11th "	13	10	20,667
12th "	13	4	19,200
13th "	13	2	18,724
14th "	12	6	16,875

Total feet board measure merchantable timber 361,366

Figures based on Spalding standard scale with allowance for loss in falling, and twenty-two inches for bark.

This tree when manufactured will yield sufficient lumber to build complete twenty-two average homes.

THE REFORESTATION PROGRAM OF NEW YORK STATE

Ralph S. Hosmer, Professor of Forestry,
Cornell University

THE purchase and reforestation of one million acres of abandoned farm land, by the State, within a period of twenty years, is the project that it is confidently expected the people of New York will approve on November 3, 1931, when they vote, on referendum, on the authorization of the investment of \$20,000,000 in this work. These are the high spots in the Reforestation Program of the State of New York. Because this enterprise will be watched with especial interest by Pennsylvanians, is the reason for this article in FOREST LEAVES. Its purpose is to fill in some of the details that round out the story.

Next door neighbors, New York and Pennsylvania share many of the forestry problems of the Northeast. Both states have demonstrated over a number of decades that they believe thoroughly in forestry. The greatly expanded program of reforestation that New York is now undertaking can but increase this friendly rivalry between these neighbors. It should, in both states, speed up the other forestry work that is now in progress, and augment it.

New York has for twenty years been acknowledged as a leader among the States of the Union in forest planting. But to get the whole picture clearly before us, it is desirable to go back still farther into history and sketch in the background out of which has developed the reforestation program of today. First as to organization. The Conservation Department of New York State is the outgrowth of the old New York State Forest Commission established in 1885. Under different names and various sorts of administrative set-up, New York has the oldest of the State Forestry Departments that have had a continuous existence. In Pennsylvania organized state forestry work started with a commission of inquiry, instituted in 1893, largely through the activity of Dr. J. T. Rothrock, the Secretary of the Pennsylvania Forestry Association.

In New York interest in setting up state forest parks in the Adirondacks, and later in the Catskills, began to take definite form early in the seventies. Since 1885 the major duty of the State Forestry Department has been the administration of the Adirondack and the Catskill Forest Preserves. Together these preserves have (Sept. 1930) a total area of 2,193,627 acres of State

owned land; 2,009,943 in the Adirondacks, 183,684 in the Catskills. But since 1894, Article VII, Section 7 of the State Constitution has carried the provision regarding the state owned lands constituting the Forest Preserve, that they "shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed, or destroyed." These inhibitions have necessarily limited the use of the Preserve to watershed protection and recreation. The latter use of these forests has in recent years been intensively developed by the State. Under a legal ruling that authorized such work, forest planting has been going on in the Forest Preserve for many years. This work began soon after 1900.

The steady growth of interest in forest planting in New York is the result in no small part of the activities of the late Clifford R. Pettis, for seventeen years (1910-1927) Superintendent of State Forests. It was he who started and built up the chain of state forest nurseries that now produce 25 million trees a year. The state nursery at Saratoga is said to be the largest forest tree nursery in the world. Others of less capacity are located in other parts of the state. Especially since 1920 has forest planting on privately owned lands in New York been advancing by steady yearly increases. In developing the administrative machinery that aids in the distribution of the forest nursery stock that is sold at cost price to private forest planters, the New York State College of Agriculture, through its Department of Forestry, and the local county agents and Farm Bureau officials, have lent material aid. The result of all this is that the people of New York are "sold" to the value of forest plantations. But a still larger task than encouraging private forest planting now looms ahead.

During the past twenty years New York, in common with other states in the Northeast, has been faced increasingly with the problem of farm abandonment. This process has been going on since shortly after the Civil War, in recent years at the rate of 200,000 or more acres a year. The total area of abandoned farms in New York is now estimated at between four and five million acres. This does not mean that agriculture as a whole has declined in this state. On the contrary, never were the better lands more productive, nor more skillfully handled. But it does mean that it has come clearly to be seen by the agricultural economists and others most concerned, that it no longer pays to attempt to farm the areas that from an agricultural standpoint are to be classed as "sub-marginal." It is such lands that are being abandoned,

the hill farms, where because of adverse climatic conditions, poor soil, and inaccessibility the experience of a century has proved that cultivation of farm crops can not be done at a profit.

Very intensive investigations of typical areas, made by the Department of Agricultural Economics at Cornell University have assembled a mass of data that confirm these statements. Especially may be noted two bulletins from that Department, No. 476, "The Utilization of Marginal Lands," William Allen; and No. 490, "Abandoned Farm Areas in New York," Lawrence M. Vaughan, both published in 1929.

Under the doctrine of wise land use, the agricultural economists are not only willing to turn these sub-marginal lands over to the foresters; they are the most ardent advocates that just this be done. For while these lands can not profitably be used for farming, they are suited for growing forests of commercially valuable trees, and should accordingly be put to use in that way. In other words, the abandoned hill farms are "forest land," and as such should be put to work producing successive crops of forest products.

Two other arguments are advanced by the agricultural economists in favor of the reforestation of the open land on the abandoned farms. One is that the scanty crops they can be forced to yield, usually at a loss to the grower, serve only further to glut an already overstocked market. The other, that by removing these lands from settlement, there will be prevented the heart-breaking failures that inevitably follow attempts to gain a livelihood by farming these inhospitable uplands.

When the hill farms of central and southern New York were first settled, soon after the Revolutionary War, those who took them up had three sources of income: First, the owners could and did cut and sell the mature trees of the original forest that covered their holdings. Second, they found part-time employment in the small, local wood using industries. Third, the produce of the cleared lands supplied the family with food. But presently the forests were cut off. The wood using plants waned and were discontinued. The farm alone was insufficient to support the family. Then, of course, too, came in competition from more fertile lands in the West, and from the lands in the valleys near by, whose owners had learned to use the intensive methods of modern agriculture. Many of the hill farms of New York probably never should have been used for agriculture. It is clear today that they are to be classed as forest land, and that the use to which they should be put is forest production.

Here is where the Reforestation Program comes into the picture. The fact that from 1/7 to 1/6 of the total area of New York had become idle and unproductive gave concern in many quarters. The problem of how a dwindling rural population could meet the growing costs of roads, schools and local administrative expenses was enough alone to force consideration of the existing situation. It was soon apparent that the question had many other aspects, as well. In short, the stage was set for a new act in the land drama.

This was ushered in by a proposal made in the winter of 1927 by State Senator Charles J. Hewitt, that the State of New York issue bonds in the amount of one hundred million dollars to be used for the purchase and reforestation of the abandoned farms. The bonds were to be issued over a twenty year period and to have a life of fifty years. In that Senator Hewitt, as Chairman of the Finance Committee of the State Senate, had a not undeserved reputation as a "watch dog of the Treasury," it was felt at first by many that his proposal was intended as a move against bond issues in general, on the theory of *reductio ad absurdum*, for New York, although a wealthy state, is now paying interest and service charges of very considerable amounts on bond issues that have been floated in recent years for various public purposes. The proposal, therefore, got little serious attention in 1927.

When, however, in 1928 Senator Hewitt again introduced his proposal, real interest began to be aroused. At a public hearing that crowded the Senate Chamber, practically unanimous approval was given to the idea underlying the recommendations, although the thought found expression that the method of financing could be bettered by substituting a pay-as-you-go plan for a bond issue. The upshot was that a special legislative commission was set up to study this whole question in its various aspects and report back to the Legislature the next year. Consequently in 1929 the New York State Reforestation Commission reported a program, and Senator Hewitt, as Chairman, introduced two bills to initiate action thereunder. Both were approved and became law.

The Hewitt Reforestation Acts of 1929 provide for two methods of approach. Chapter 194 authorizes the state to cooperate with the counties, by giving financial aid of not to exceed \$5,000 a year to any county that appropriates an equal or greater amount for reforestation work. The idea is that the resulting county forests shall be made up, for the most part, of holdings of less than 500 acres in any one block. In 1930 twenty counties

took advantage of the offer, in amounts ranging from one to five thousand dollars. The total advanced by the State for this work was \$46,832. The number of counties cooperating in 1931 is about the same, although the amount paid out by the State may be larger. It is anticipated that this law will continue to function until the counties have bought up and established forest plantations upon as much land as they care to manage as county forests.

The other, and more important law, Chapter 195, (1929) authorizes the State itself to acquire "by gift or purchase, reforestation areas which shall consist respectively of not less than 500 acres of contiguous lands, which "shall be forever devoted to the planting, growth and harvesting of such trees as shall be deemed by the Conservation Commissioner best suited for the lands to be reforested." This law specifies that these lands shall be outside of the Forest Preserve counties; that the Conservation Commissioner may sell timber or other forest products from these forests; and that the work of establishing and managing them shall be under his direction. The act carried \$120,000, immediately available. For the fiscal years 1930-31 and 1931-32 appropriations, respectively, of four hundred and six hundred thousand dollars are available. These constitute, together, the first million of the twenty million that the whole program entails.

The acquisition of land was started immediately after the approval of the act on March 29, 1929, and on October 3 of that year the first trees in the first plantation were set with appropriate ceremony at Scott in Cortland County. By the end of the calendar year 1930 the total area acquired was 35,672 acres, in 46 areas in 13 counties. Of this 5,411 had been planted. The average cost per acre in 1930 was \$3.81; of setting out the forest plantations, \$7.56 per acre. From now on as the administrative handling of the acquisition and planting work is further organized, the progress of the program will be accelerated, until it conforms to a schedule that calls for 30,000 acres to be reforested in 1933 and then by increases of 10,000 acres a year, to 100,000 acres in 1940.

To make provision for these coming years is the purpose of a concurrent Resolution of the Senate and Assembly, introduced in 1930, that is known popularly as the Hewitt Amendment. As this involves a slight modification of the State Constitution it has to be passed by two successive Legislatures and then submitted to the people on referendum. The Hewitt Amendment was approved in 1930 and unquestionably will be again this winter.

It comes before the people on November 3, 1931. There is every reason to expect that it will be approved then by a large majority.

(To be Continued)

Every treetop lives in a desert, exposed to hot sun and drying wind; it is, moreover, farthest removed from the base of water supplies. It responds to these desert conditions by becoming more or less like a desert plant, Professor Bruno Huber, of the University of Freiburg, has discovered. An examination of leaves and stems from the tops of trees showed anatomical differences according to their location in sun or shade. "Shade leaves" were more like those on the parts of the tree closer to the ground and better sheltered from evaporation; "sun leaves" were protected in various ways from the drying effects of the air. Sometimes they worked to keep down the rate of evaporation by means of thicker skins, smaller cells, tinier breathing-pores or stomata, and sometimes they yielded to the air's demand for water but had better facilities for renewing the supply from beneath. Professor Huber calls attention to the fact that plants of both types can sometimes be found growing side by side in places where the evaporation rate is high.—*Science*.

Five thousand years ago Egyptian furniture makers were building furniture that has just been found by a scientific expedition conducted by Harvard College and the Boston Art Museum. This ancient furniture, supposed to be the oldest in existence in the world today, well illustrates the marvelous durability and lasting qualities of wood. The articles, consisting of chairs, chests and beds, were found in the tomb of Queen Hetephres, mother of Cheops, and said to be older by 2,000 years than the many priceless relics found in the tomb of the famous King Tut.

The Board of Game Commissioners has completed the purchase of 14,104 acres of ideal game territory in the Mehoopany Creek section of Wyoming County. The tract will be known as State Game Lands No. 57, according to Mr. W. Gard. Conklin, of the Bureau of Refuges and Lands. The tract is within easy reach of Wilkes-Barre and Scranton, and will provide public hunting grounds for many of the thousands of hunters in that vicinity. Deer, bear and rabbits are reported abundant on the lands. The territory is a natural habitat of ruffed grouse, which apparently are on the increase.

DEPARTMENT OF FORESTRY
STATE COLLEGE
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FOREST LEAVES

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THE PENNSYLVANIA FORESTRY ASSOCIATION FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 714 Commercial Trust Building, Philadelphia.

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SUMMER MEETING OF THE PENNSYLVANIA FORESTRY ASSOCIATION

THE summer meeting of the Pennsylvania Forestry Association will be held June 25, 26, 27 at State College, Pa. The meeting will start with a banquet at 6.30 P. M., at the Nittany Lion Inn, followed by a meeting of the Forestry Association in the assembly room. The members will be welcomed by Dr. Ralph D. Hetzel, President of the Pennsylvania State College. Talks will be given that evening and the following evening by representatives of the many forestry interests in Pennsylvania.

The morning of Friday, June 26, will be spent on the Penn State Forest in Stone Valley, under the direction of T. Roy Morton, District Forester. A visit will be made to Bear Meadows, a high, cold and swampy valley surrounded by mountains. Here may be seen spruce growing naturally, sphagnum moss, pitcher plants and other representatives of a more northern flora, remnants of the vegetation left by the receding ice sheet. A white pine plantation which 20 years ago was declared to be worthless and which was believed would never grow into a forest, due to the ravages of the white pine beetle, will be inspected. A stop will be made at the Nature Education Camp near Ross Run and a trip will be made through the Alan Seegar Monument, a remnant of Virgin Hemlock forest, containing some of the largest hemlock trees left in the State.

In the afternoon at 1.30 P. M., a visit will be made to the estate of Col. Theo. Boal, a member of the Council of the Pennsylvania Forestry Association. The nursery of the Rockview Penitentiary will be inspected. A stop will be made at the State Fish Hatchery at Pleasant Gap, to observe the methods of rearing brook trout for stocking the streams of the State. The beautiful spring at Bellefonte, which gives the name to that village, will be visited and the famous large brook trout in Spring Creek below the dam in the village will be seen.

An evening meeting of the Forestry Association will be held at 8 P. M., in the second floor lounge

of "Old Main," the reconstructed Old Main building on the college campus, which is now the center for student activities and for college administration.

On Saturday morning, June 27, a trip will be made through the Bald Eagle State Forest, under the direction of Raymond B. Winter, District Forester. A view of the beautiful farming country in Nittany Valley will be seen from the top of Nittany Mountain, near Center Hall. A visit will be made to Penn's Cave, one of the famous caves of the State, and one of the few caves in the country in which the trip is made by boat. This cave is lighted by electricity. The route of the travel will then pass through the Millheim Narrows, crossing the mountain to Lamar, then crossing back through the Narrows along Fishing Creek to Livonia, where a chicken and waffle lunch will be served at the Inn well-known to fishermen and hunters.

In the afternoon the trip will continue over the State Forest Road through the Bald Eagle State Forest to the Voneida (Hairy John's) State Forest Park and from there to the Joyce Kilmer Monument.

Members expecting to be present should advise C. P. Birkinbine, Secretary, 714 Commercial Trust Building, Philadelphia, Pa., and detailed information will be sent to them later.

Headquarters will be in the new "Nittany Lion Inn," on the college campus, where members should make their reservations.

In the territory served by Southern Railway System, there are now more than ten million acres of forest lands, including national forests, under some measure of conservative forest management and fire protection. While this is not immediately productive of substantial railway revenue, it is significant of future industries utilizing forest products, particularly when consideration is given to the fact that Southern pine will grow to pulpwood size in approximately one-sixth of the time required for Northern spruce.

LAND UTILIZATION AND THE FARM PROBLEM

THE United States Department of Agriculture has issued an interesting brochure bearing the above caption. The following excerpts in regard to forest lands will be of interest:

The original forest resources of the United States were so enormous in relation to the requirements of the population in the early days of the Nation's history that there was little apparent need for timber conservation. At the present stage in the national development, however, a period of great scarcity of timber can be foreseen as likely to occur at a comparatively early date. Nevertheless, as long as a considerable supply of virgin timber is available, there is little inclination on the part of private owners, who control over 70 per cent. of the total area of forest lands, to husband the remaining supply, and still less to provide adequately for reforesting the cut-over area. The timber reserves of the national forests, even with the best of care, will be far from sufficient to maintain a supply of timber that will satisfy the probable demand.

The problem of a wise utilization of land for forests is intertwined with the problem of agricultural-land utilization in a number of ways: (1) In determining the economic feasibility of agricultural expansion or reforestation, the relative advisability of the two alternative uses should be considered. Large districts of land in farms are being found unsuited for farming; whether they can be profitably devoted to forests by private owners is uncertain, and the problem is frequently affected by existing methods of taxation, unavailability of fire protection, the outlook for timber prices, and credit conditions. (2) In many districts the use of low-grade land for continuous timber growing would increase economic stability by providing markets for crops and supplementary employment for farmers and other rural people. (3) A program of forest management for farm wood lots, which contain about 30 per cent. of the total forest area of the Nation, is intimately related to the general farm economy. (4) The progress of soil erosion and the control of floods, and in irrigated sections, the adequacy of water supply and the prevention of injury from silting in reservoirs and ditches, are affected in an important degree by the location of forest lands.

As lumbering advanced into each new area, the cutting of timber gradually approached a peak, and then declined as the more accessible tracts and

the most desirable stands went down before the ax. In the northeastern quarter of the country, the peak was passed long ago, and the present cut is only a small percentage of the peak volume. The peak has also been passed, though more recently, in most of the Southern States. The present drain on the forest of that region is so rapid that the major portion if its forest resources will be exhausted apparently in about a decade, and the greater part of the timber supply of eastern consuming centers will have to be brought at heavy transport costs from the West, which is already contributing extensively to the lumber requirements of the country. A large proportion of the area cut over is not well adapted to crop production and is not likely to be required for that purpose for a long time, if ever. In the meantime, the cutting of the timber and resulting idleness of the land are associated with other important problems growing out of extensive tax delinquency, decline of cities and villages dependent on the lumbering industry for support, and increasing sparseness of population. These conditions, in turn, react unfavorably on the prosperity of near-by farming districts.

About three-fourths of the forest area of the country is still in private ownership, mostly subject to wasteful exploitation. The national forests have been created largely by reservations of timber-producing districts from the public domain, but little more timberland remains in the public domain, and that is not of the best quality. A notable expansion of the forest area in public ownership can occur, therefore, only by acquisition of lands now privately owned. Less than 1 per cent. of the total area has been purchased by the Federal Government in nearly two decades, and purchases to be made under existing plans contemplate an addition of less than 3 per cent. The States are making some purchases and are acquiring some tax delinquent land. One State (New York) is initiating a policy of purchasing farms located on poor land, as a means of increasing its forest holdings and of retiring unprofitable farm units. The total area of State forests and parks, however, amounts to less than 7,000,000 acres, and is not being rapidly increased. Moreover, most of the present holdings and the greater part of the activity in acquisition are confined to a few States. New York and Pennsylvania have more than half of the total area of State forests. Many States in which a program of public acquisition is most desirable, either have not recognized its importance or have not cared to assume the financial burden of such a program.

PLANTING BLACK WALNUT IN PENNSYLVANIA

By Thomas C. Williams, Assistant Forester,
Sprout Forest District

RECORDS of the Pennsylvania Department of Forests and Waters show that between the years 1908 and 1929, 44 black walnut plantations were established with a total of 67,524 seedlings, on State Forest land in all parts of the State. The first black walnut plantation that was made on State Forest land is located in the Sprout State Forest District, at State Camp, Clinton County, about 10 miles south of Renovo. The planting was made by Dr. J. T. Rothrock and Forest Ranger John Winklebleek. Six bushels of nuts were planted, spaced 8 x 8 feet, and covered 3.8 acres. The purpose of this plantation was to determine what effect the climatic conditions of the plateaus of northern Pennsylvania had upon this species. A recent examination showed that this plantation was almost a complete failure, and only a few trees on the site of an old barn have reached a height of 20 feet. All the other trees are practically dead, due to the poor soil in which they were planted and the severe winter weather which they were forced to endure.

The planting of black walnut trees on private land has been somewhat more extensive than that on State Forest land. The records show that between the years 1910 and 1929, 800 private plantations in 66 different counties planted 441,899 black walnut seedlings. Several years ago the Department conducted a series of field studies throughout the State of black walnut plantations. Data covering distribution, soil requirements, reproduction, and other factors were collected on about 100 plantations, and a few on natural stands. It was discovered that 90 per cent. of the plantations were failures, 5 per cent. partially successful, and the remaining 5 per cent. might be classed as successful.

The importance of soil quality is shown in a report of Forester LeRoy Frontz of a plantation located on lands owned by M. W. Nace, Ayr Township, Fulton County. Mr. Nace secured 200 black walnut seedlings from the Department of Forests and Waters in the spring of 1921, and planted them in an abandoned field near his home. The soil, a limestone clay with a depth of from 1-2 feet, slopes slightly to the west, with a medium moisture content. The spacing was 7 x 7 feet. Seven years after planting the records show that

95 per cent of the trees were living and had attained a height growth of 8.9 feet, with an average diameter breast high of 1.2 inches. The average height growth during the growing season of 1928 was 2.2 feet, with a maximum height growth for the same year of 3.6 feet. There were no trees damaged by frost.

Measurements were also taken of seven other trees not included in the above plantation, which were planted in soil loosened by dynamite. These trees were also seven years old, spaced 7 x 7 feet, and showed 100 per cent. survival. The average total height growth was 13½ feet, and the average diameter breast high was 2.2 inches. The average current growth of 1928 was 4.107 feet, with a maximum current height growth of 8 feet. This clearly demonstrates the importance of loose soil, in addition to a rich soil, in the growing of black walnut.

A black walnut plantation of 12,850 trees was made in 1914 on the Rothrock State Forest in Shirley Township, Huntingdon County. The soil was a medium clay loam, and situated at an elevation of 1,000 feet. Most of the plantation is on a site formerly occupied by farm buildings, and covers an area of about 1½ acres. The trees on this site are of good form with little or no evidence of frost damage, and are making satisfactory growth. In 1918 a portion of the area in an open field was planted with white pine, because a large number of the trees failed due to frost. At the time of the examination, the white pines were about five feet in height, and due to this protection, many of the walnut which started to grow vigorously were suffering less from late spring frosts. An interesting fact in connection with this plantation is that some of the pines are dying due to the toxic effect that is characteristic of the black walnut. Measurements taken of a portion of this plantation on the site of the farm buildings show that they reached an average total height of 20 feet, while those in the field site had reached an average total height of only four feet. Ninety-five per cent. of the trees on the farm site were living as compared with 55 per cent. in the field site. This condition may be attributed to the difference in fertility of the soil on the two sites.

Another black walnut plantation which shows the value of deep fertile soil is the Shonheur plantation in the Tioga State Forest, established in 1908 by the planting of nuts. This plantation occupies a site 1400 feet above sea level on a deep fertile loam soil. The trees attained an average height of 30.9 feet in 20 years, and an average

diameter of 7.1 inches. A crop of nuts was produced in 1928 and the specimens which were examined were found to contain fully developed kernels. This evidences the fact that black walnut may stand adverse climatic conditions if planted on proper soil.

A recent study of a black walnut plantation on the Mont Alto State Forest shows a mean annual increment of 49.52 cubic feet, or almost one-half cord per acre per year. This plantation was established in 1909 by planting one-year-old seedlings. The area in which the measurements were taken comprises .39 acres. On this area 69 dominant trees have an average height of 34.8 feet and an average diameter of 6.6 inches; 209 co-dominant trees have an average height of 32 feet and an average diameter of 5.14 inches; 97 intermediate trees have an average height of 27.3 feet and an average diameter of 3.68 inches; and 36 suppressed trees have an average height of 21.7 feet and an average diameter of 2.45 inches. Another study made of a black walnut plantation on the Mont Alto Forest near the mouth of Vineyard Run shows a mean annual increment of only 22.78 cubic feet per acre per year at the age of 15 years.

The conclusions reached are that black walnut has been planted extensively throughout the State, and that 90 per cent. of the plantations have been failures. Field studies have very clearly shown that only the very best soils will produce successful black walnut plantations, and the planting should be confined to the southern and eastern sections of Pennsylvania in the fertile agricultural valleys. Experience has shown that the planting of nuts is more suitable and economical than the planting of seedlings.

The oldest bearing apple orchard in America is said to be the famous grove on the eastern slope of the Menzano Mountains in New Mexico. When Menzano colony was established more than a century ago these trees were bearing good crops. That they had stood mature trees, for more than a century previous to that time there is little ground for doubt.

The Borough of Piteairn has passed an ordinance establishing a shade tree commission, and the burgess, M. M. Thompson, appointed the members of the commission.

HAVE FOREST FIRES ALWAYS OCCURRED?

By Prof. H. J. Lutz

“THE traveler through the valley frequently passes through tracts of timber where the tall trunks stand denuded of their limbs and foliage, scarred and blackened by destructive fires which are sometimes started by lightning, but as probably by negligence or the nefarious purposes of hostile Indians. It is one of the grandest sights by night to watch the progress of the fearful element through the close-grown trees; the hissing of the flames enveloping the green limbs; the crashing of falling logs, and the clouds of belching smoke that darken the starlit sky; the lurid glare and fitful light, in which the outlines of the hills and woods are seen starting from obscurity into view, to sink again into thicker darkness; these, with all the minor concomitants of such a scene, make an impression on the mind which can never be effaced.”

“From its combustibility extensive tracts of this forest [Douglas fir] get burnt every year, taking fire from friction or any other slight cause. During our ascent of the western slopes of the Cascade range we passed for days through dead forests, perhaps burnt by ignition from the hot ashes which were thrown out from Mount St. Helen's several years before; but large tracts were on fire at the same time, filling the air with smoke, so that we could not see the surrounding country for several days. Large tracts of the eastern slopes of the Coast range are also desolated by the same cause.”

The first quotation is from the writings of John Lambert and the second from Dr. J. G. Cooper, both appearing in the “Reports of exploration and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean,” 1853-5. Mr. Lambert was writing of conditions in the region that is now northern Idaho and Dr. Cooper was in what was then the Territory of Washington.

References of this sort are not uncommon in the early literature dealing with forest conditions in America. One is led to the conclusion that forest fires, of greater or lesser severity, have probably burned ever since there were forests. And this is not surprising.

Lightning is today one of our common causes of fire in the forests and we have no good reason to believe that it was any less important cause before the advent of white men. Lightning alone, if there

were no other causes, would account for many fires in the unprotected woods.

The American Indian has commonly been credited with starting forest fires, both intentionally and accidentally, and, possibly as commonly, this has been denied. It is stoutly argued by some that the Indian was extremely careful with fire in the forest; that he recognized the evils of forest fires and did all he could to prevent them. On the other hand, the literature abounds with what appears to be well authenticated statements of responsible individuals to the effect that the Indians commonly did employ fire in the forest to achieve various ends. They used fire to reduce the forest under-growth so that they could see game more easily and travel about readily, and, as they thought, to increase the forage for deer and other animals. They also used fire in their hunting to renew the huckleberry and blueberry bushes; and as an implement of war.

It appears that fires did occur in the forests since the earliest times. It is reasonable to expect, however, that in the virgin forest, fires were, as a rule, of lesser severity than the fires of today. The lessened severity of fire in the virgin forest, as compared to our fires of today on cut-over lands, was probably due to the smaller amount of fuel on the ground, and the density of the stand which prevented free circulation of air and rendered the environment relatively cool and moist. Our question, stated at the outset, must be answered in the affirmative.

THE APPALACHIAN TRAIL IN SOUTHERN PENNSYLVANIA

THE first steps towards the marking in southern Pennsylvania of the extensive through hiking trail known as the Appalachian Trail, extending from Maine to Georgia, were recently taken when 31 miles of trail were marked from the Maryland-Pennsylvania boundary through the Mont Alto and Michaux State Forests. The Appalachian Trail is a hiking trail following the crest line of the Appalachian range and extending from Maine to Georgia. When completed it will extend between 1300 to 1500 miles through the wilderness. Already 600 miles of the Trail have been completed and some 400 miles of existing trail will be marked in the near future.

Much work has already been done on this through Trail adjacent to Pennsylvania. The Potomac Appalachian Trail Club, a Washington organization, numbering 275 members, has already completed 145 miles of continuous marked trail

from Harpers Ferry through the Shenandoah National Park in Virginia. This Club has scouted and is now engaged in cutting the skyline route through Maryland along the South Mountain. Between the Hudson River and the Delaware Water Gap, a distance of 100 miles, the Trail has been completed by a group of New York enthusiasts under the leadership of Raymond H. Torrey, R. R. Goodlatte and F. F. Schuetz. Two Pennsylvania Clubs, the Blue Mountain Club and the Blue Mountain Eagle Climbing Club, have practically completed the section between the Delaware and Susquehanna.

Trail development in southern Pennsylvania had so far been delayed by reason of the uncertainty as to whether the route should follow the North Mountain or the South Mountain. The latter route was selected for the reason that it affords direct connection with the Trail cut by the Washington group.

The Appalachian Trail project and the marking of the Trail through the State Forests has been specifically endorsed by the Pennsylvania Department of Forests and Waters. The route of the Trail was suggested by T. O. Bradley, District Forester of the Mont Alto Forest, and J. R. Williams, District Forester of the Michaux Forest. The Trail extends from Pen Mar, past the Buena Vista Hotel into the Mont Alto Forest and over Chimney Rocks, past Snowy Mountain fire tower and down Corl's Ridge to Caledonia Park. From the Park it leads up through Quarry Gap over the Big Piney Flats, past the Big Flats fire tower. The route is marked by the standard Appalachian Trail metal markers, which have the Appalachian Trail monogram. Over 300 markers were used for 31 miles of the Trail marked.

The marking of the route was done by M. H. Avery, President of the Potomac Appalachian Trail Club, and J. F. Schairer, Supervisor of Trails of this organization. Mr. Avery said:

“We are frankly very enthusiastic over the route selected by District Foresters Bradley and Williams through the Mont Alto and Michaux State Forests. It is in every way fully up to Appalachian Trail standards. Due to the low altitude of South Mountain, as compared with the height of mountains of the same chain to the south, we were most agreeably surprised at the extent and magnificence of the panoramic outlooks. The extensive level areas, such as the Big Flats, on the watershed of the Appalachian Range are most unusual. The trails used for the Appalachian Trail are wide and well maintained. Chimney Rocks, Snowy Mountain and Big Flats fire towers

afford splendid vistas. We were also somewhat surprised to note the extent of the recreational development of the Forests. We think that south of New York State—not excluding the new Shenandoah and Great Smoky National Parks—their development is unequalled. The region is of much historical and economic interest. The Forest School and plantations at Mont Alto are among the oldest in America and will well repay a visit.

We venture to predict that the existence of a marked continuous hiking trail through this region, affording opportunity to penetrate into the more inaccessible regions will result in a substantial further increase of the utilization of the recreational features of the Forests. The Appalachian Trail to be of maximum usefulness must, of course, have shelters, distant an easy day's journey from each other. Already the beginnings of a shelter system are in the Forests apparent."

The Washington group plans to return in the near future to complete the marking of the Trail through the northern end of the Michaux Forest across the Cumberland Valley to Lams Gap and along the North Mountain to the Susquehanna River.

In addition to placing markers on the route, the distance was accurately measured with a cyclometer on a measuring wheel. When the route is completed, directions will be available for hiking the Appalachian Trail in southern Pennsylvania, together with notes on side trails to points of interest off the Appalachian Trail.

GOLD DUST FROM SAW DUST

By V. M. Bearer, District Forester

AMERICA'S wood waste and mountains of saw dust may be literally converted into gold dust, according to Dr. P. G. von Hildebrandt, of Pittsburgh. From hard or soft wood, with or without the bark, from waste wood and saw dust he has developed a product "destined, if the tests mean anything, to revolutionize the building industry as well as the pulp and paper making industry."

Dr. von Hildebrandt was once a Captain of the Imperial Guard Uhlans of Potsdam, has won the support of Pittsburgh capital and now has a \$200,000 plant and laboratory near completion at Springdale, Allegheny County, adjacent to the West Penn Power Plant.

A company, The International Fiber and Chem-

ical Corporation, has been organized. Mr. H. B. Salkeld, of Pittsburgh, president of the company, states that "From the mill waste of the lumber industry will be given to the world, a fireproof wallboard, synthetic felt, conduit insulation, synthetic cork, and a number of other products. Easily sawed and penetrated by nails, although seemingly as hard as steel, this new material will serve many purposes in carpentry." "To the average wage earner, it means an inexpensive home, without a fire hazard," says the inventor.

A comparative test of steel, asbestos, and Dr. von Hildebrandt's material is reported to have shown the following results:

1. A piece of steel, 7/16" thick by 11½" long was severed lengthwise with an acetylene torch producing 6400 degrees Fahrenheit, in a period of 25 seconds.
2. A piece of asbestos, similar dimensions, was severed lengthwise in 2½ minutes and continued to glow after the torch was removed.
3. A piece of the new wood product was put under the same torch. After five minutes it had cut only 4½" into the length of the material. The torch operator then announced that the tip of the torch was being injured by the resistance of the material. While the torch flame was playing against this material, many tender hands of office workers felt it without shock, although the steel was still fiery hot one-half hour later.

President Salkeld advises that waste liquors which result from the reduction of pulp wood to wood pulp, can be neutralized by treatment with lime in order that the residue flowing into streams will not prove harmful. Under his new process, it is reported that Dr. von Hildebrandt converts pulp wood to wood pulp in from three to four hours as compared with twelve to eighteen hours under the standard sulphate sulphite process.

House Bill No. 221 provides for a deficiency appropriation to the Department of Forests and Waters of \$600,000, which will be used in the payment of forest fire extinction costs incurred during the past summer. This bill passed the House and Senate and was signed by the Governor.

CONTROL OF THE WHITE PINE WEEVIL ON THE ELI WHITNEY FOREST

Yale Forest School, Bulletin No. 29, 1930

By William Maughan

RELATIVELY few of the numerous publications dealing with the white pine weevil carry their discussions beyond the point of recommending measures which are believed to afford some degree of control. These few take up the standard where it was dropped by the majority, and report on the costs and practical results of applying some of the suggested control methods. Of the several control measures recommended only two have been experimentally applied and the results made available. The two measures referred to are the making of several net collections of adults during the summer from the pine leaders, and the systematic annual cutting and disposal of infested leaders. The recent Yale bulletin by William Maughan reports on the costs and results of applying the latter method to as many as 286 acres of white pine plantations annually over a period of twelve years.

The increase in weevil damage following the extensive planting of white pine is noted in the introduction, as well as the subsequent tendency to substitute red pine. The freedom of red pine from damage by the white pine blister rust and the white pine weevil (the author erroneously states that "this species is not attacked by the weevil," whereas he evidently has in mind that it is not severely attacked), and its greater hardness are contrasted against the more consistent growth rate, the greater mature height, the denser mature stands, the resulting greater volume growth over a period of year, the higher technical value of the wood, and the greater demand for the wood of white pine, and the conclusion is drawn that a crop of white pine should produce a greater financial return than a crop of red pine. With relation to enemies, the author disposes of the blister rust of the white pine by stating that in parts of New England the disease is not serious because of the scarcity of *Ribes*, the necessary alternate host, and that where the disease is serious it can be locally controlled by the pine owner. The weevil then remains the most serious enemy of the white pine.

The author describes the system of controlling the weevil that was successfully developed on approximately 900 acres of pure white pine plantations in the Eli Whitney Forest, owned by the

New Haven Water Company. Control work was initiated in 1919 and consists of systematically locating, cutting, and burning the weeviled tips each year from the time the plantation is first infected until the crown cover closes. The period during which control work is done averages about eight years. After the stands close, the work is too expensive to be practicable, but fortunately, weeviling subsequent to the closing of the canopy is not sufficiently injurious to the form of the trees to necessitate control work. The total cost of control work in the plantations in which treatment has been completed averages about \$5.00 per acre. The objective is to reduce the amount of infestation so that enough trees which are not weeviled, or but slightly affected by weevil, in the lower 17 feet will remain to furnish a fully-stocked stand of acceptable stems in the final crop.

In 1930 the author investigated the actual results of this control work and found that it resulted in a reduction in the amount of infestation beginning the second or third year after the work is started and becoming more marked during succeeding years. In the stands in which treatment has been completed, more than enough acceptable stems have been secured on the medium and better sites. On the poorer sites enough acceptable stems are not secured by treatment.

Thus the author disposes of the weevil problem on the better sites, and advises the planting of white pine thereon. He believes that the advantages to be secured from the use of white pine will justify the additional cost of protecting it against the weevil.

Apropos of the tendency of some foresters to stress the supposed "freedom from enemies" of some species, the author states:

"While now the red pine seems to be free of enemies, it is not at all impossible that in the course of time enemies will appear. In fact the European pine shoot moth (*Rhyacionia buoliana*) which attacks terminal shoots, is already present in southern Connecticut."

While this is a thought in the right direction, the statement is unwarrantably mild. Other enemies of red pine than the pine shoot moth are already increasing among our plantations of this species, as evidenced by the serious damage to red pine plantations near Saratoga, N. Y., the cause or causes of which have not as yet been positively determined. We must expect that extensive pure plantations of any species will aid in the development of pests attacking that species. Natural forces are continually at work to maintain a balance in the existence of all life and unbalanced forest

planting can not long succeed against these forces.

The bulletin includes an adequate statement on the nature of weevil attack and its results, accompanied by excellent photographic illustrations. The policy of weevil control on the Eli Whitney Forest is outlined and the methods of weevil removal described in detail. In the 1930 study of the results of this control work, 82 temporary sample plots were established and tallies were made on 4 permanent sample plots on the Forest, and 9 plots were laid out in an untreated 44-year-old plantation outside of Forest. The criterion by which the results of weeviled tip removal is judged is the number of acceptable (or undamaged) dominant and co-dominant stems per acre, with 200 as the dividing line, representing the required number of trees per acre in a fully stocked mature stand. This arbitrary figure is rather low, for it presumes maturity at 82 years for Site I and 93 years for Site II, which is beyond the financial maturity under present eastern practice. However, this method seems to measure more sensibly the control results or the damage, if you will, than the more common method of including all the trees or even all the dominants and co-dominants on an acre, regardless of their probable presence or absence in the stand at maturity, and therefore of their share in the value of the ultimate crop. The use of such a criterion, of course, presupposes that the acceptable stems will be as well distributed over the acre as are the remaining individuals in a normal, full-stocked mature stand. The author discusses the matter of distribution and graphically shows its adequacy in a sample plot studied.

The cost of control work for the 1930 season is presented in some detail. For the 286 acres treated, it averaged 59 cents per acre. Using this figure for the annual cost and multiplying by 8, the average number of years a stand is worked over, gives \$4.72 as the total cost of control per acre. The cost per acre increases in proportion to the number of tips removed, as well as with the density of the stand and the height of the trees.

The average recent annual freight bill on all lumber shipments in the United States aggregates 420 million dollars, as against a mill value for the same lumber of 800 million dollars. In other words, the freight alone represents more than 50 per cent of the value of the commodities carried.

George Sowers, of Gardners, was sentenced to serve from eleven months to two years in the Cumberland County jail on charges of firing forest land.

NOTES ON FORESTRY IN THE QUEEN CHARLOTTE ISLANDS, B. C.

By Edward Woolman

THE Drinker-Woolman Expedition to the Queen Charlotte Islands was undertaken last summer by the Academy of Natural Sciences, primarily to study the sea birds which breed there. Although these islands are now 85 miles off the coast of British Columbia, at some pre-historic age they were probably a part of the main coast, as shown by the conglomerate boulders and cliffs observed in many places. The climate is milder there than along the rugged coast of British Columbia, being influenced by the Japan current. Summer is never hot and winter is generally above freezing. But the weather is apt to be foggy and rainy, excepting on the eastern coast.

As some of the sea birds have not migrated for unknown generations, they have developed changes in plumage and in nesting habits, due in part to the extremely wet weather.

These weather conditions have also been very favorable to the growth of trees. The Sitka Spruce, especially, has developed wonderfully. We saw a few trees six and eight feet in diameter, and one hundred feet in height, and many are reported to be two hundred feet in height, and still uncut. We also saw many large stumps, which had been cut in 1918, for shipment to Europe during the war, for the aeroplane industry. Up the Yakaun River, we discovered a Sitka Spruce that may be a Sport, as it was golden from top to bottom. The trunk was over six feet in diameter, as the writer was nearly lost, in walking around the base, while collecting cones for seed. Instead of returning direct to the river, I started off on a bear's trail. These cones have been sent to the Mont Alto Research Laboratory for trial. The wood from Sitka Spruce is very fine grained, yet strong and elastic. The British Columbia Government estimates there are four and one-half billion board feet still uncut on the islands, and some trees will cut fifty thousand board feet.

The only logging operation that was seen was on Massett Inlet, where they were cutting Red Cedar for poles, and shipping them to California. This logging must be profitable, as the timber is growing right on tide-water; ships were being loaded close to the works. The government estimates three and one-half billion board feet of standing Red Cedar.

We saw some splendid Hemlock along the one



HEMLOCK AND CEDAR TREES, ON ROAD TO NORTH SHORE, JUST OUTSIDE
NEW MASSETT, QUEEN CHARLOTTE ISLAND, B. C.



JACK PINE AND BALSAM FIRS, PEACE RIVER DISTRICT, B. C.
Photos Courtesy Edward Woolman.



RED CEDAR, QUEEN CHARLOTTE ISLAND, B. C.



GENERAL WASHINGTON'S HEADQUARTERS AT VALLEY FORGE, PA.
Photo Courtesy Dept. Forests and Waters.



HEMLOCK AND CEDAR TREES, ON ROAD TO NORTH SHORE, JUST OUTSIDE NEW MASSETT, QUEEN CHARLOTTE ISLAND, B. C.



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RED CEDAR, QUEEN CHARLOTTE ISLAND, B. C.



GENERAL WASHINGTON'S HEADQUARTERS AT VALLEY FORGE, PA.
Photo Courtesy Dept. Forests and Waters.

road that crosses Graham Island to the North Shore. This road is made of 2 inch Red Cedar planks, laid lengthwise on the deep humus or spagnum of the woods. These trees were also 150 to 200 feet in height. The government estimates that five and one-half billion board feet can be cut.

The only Hard Wood noted was Alder, which is growing in small groves, and looks like White Birch, as one paddles up the rivers.

It was reported that there is a pulp mill in operation on Moresby Island. This small timber cuts 50 to 100 thousand board feet to the acre.

While on Graham Island we saw no burned land; the forest floor is always wet, on account of the rainy weather, and a fire cannot travel far. Farming is developing very slowly, and there is practically no camping.

The expedition brought back 450 bird skins of 80 species, also the complete skeleton and hides of two large bears, and many ferns, flowers and sea shells, etc.

The mountainous region of the west coast is impenetrable forest and unexplored except by a few mining prospectors. The rivers flowing into Massett Inlet are kept open by the government for the salmon to run up to spawn. During the spawning season the bears are common along these rivers.

At the present time the chief industry is canning the five varieties of salmon that abound in these waters.

MEASUREMENTS and observations taken on the Mont Alto and Michaux State Forests in Franklin County indicate that the tree growth of 1930 was 25 per cent less than that of 1929, as a result of the drought. White pine showed a loss in diameter growth of 28 per cent. Similar conditions were observed in the Rothrock District in Hutingdon County and in the Penn District in Mifflin and Centre Counties.

On the basis of an average growth of 40 cubic feet per acre per year, the 1,429,135 acres of State Forests suffered a loss of 14,290,000 cubic feet or 158,700 cords. On the basis of an average growth of 25 cubic feet per acre per year, the 13,206,000 acres of forest land in the State suffered a loss of 82,538,000 cubic feet. In addition, thousands of forest tree seedlings have died as the result of the drought.

C. T. Settlemyer, of Wilmore, Cambria County, has placed 95 acres of forest land in the auxiliary forest reserve class.

THE REFORESTATION PROGRAM OF NEW YORK STATE

Ralph S. Hosmer, Professor of Forestry,
Cornell University

(Concluded)

The Hewitt Amendment does two things: First, it provides a legal and satisfactory method of financing the Reforestation Program for the twenty years needed to carry it through to completion. In any forestry operation continuity of plan and effort is essential to success. To establish these new forests through planting requires an initial outlay. Money in annually increasing amounts must be assured to enable the program to go forward steadily and consistently. It would be folly to increase the state nurseries and build up an organization of efficient tree planters and then suddenly to cut down the allotments that are necessary for the proper and expanding conduct of the work. This amendment provides for what in effect is a mandate by the people to their representatives, the senators and assemblymen, to appropriate over a period of 15 years, annually increasing amounts, until the total of \$20,000,000 shall have been reached. When approved by the people next November there will thus be authorized the appropriation of one million dollars for the fiscal year 1932-33. Then, by yearly increasing steps of \$200,000 each for the next five years, until the annual appropriation reaches two million a year. Then for five years more, two million a year until the total of twenty million dollars has been made available.

These it is true are large amounts, but if the bond issue method had been followed, in the end the people would have had to pay out much more, for bond issues entail both interest payments and carrying costs. On this pay-as-you-go basis the money advanced is really an investment. The forest will pay interest to the people in the way of yearly accretions of woody growth that in time can be converted into money, when the trees in the planted forests reach merchantable size, are cut, and turned into cash assets. In time the initial investment as well will be paid back by these forests into the state treasury. From then on successive forest crops will, under proper forest management, continue indefinitely to make money returns, at periodic intervals, into a remote future.

As no Legislature can force or bind the actions

of its successors, it is necessary to go back to the ultimate source of authority, the people themselves, to direct that adequate financial provision be made, other than by a bond issue, for carrying out a program for the public good that must necessarily run over a term of years. It is felt that the method called for in the Hewitt Amendment solves this problem. It has the further advantage of letting the initial costs of the reforestation be paid for on the pay-as-you-go basis.

The second part of the Hewitt Amendment, by the addition of a new section to Article VII of the State Constitution, permits the State to buy, and manage and use as "production forests," land in the so-called "Forest Preserve Counties," but outside the boundaries of the parks, that as the law now stands would fall at once, if bought by the State, under the inhibitions of Article VII, Section 7, noted above. The Forest Preserve Counties, 16 in number, are those in which lie the Adirondack and the Catskill Parks. The "Parks" are the areas shown on the State maps as bounded by the "Blue Line" (the color might just as well have been green or red) within which the lands owned by the State constitute the State Forest Preserve. There are some scattered pieces of forest preserve land outside the Blue Lines, but for many years now the State has restricted its "preserve" purchases to lands within the Park boundaries. The privately owned lands within the Parks are not subject to Article VII, Section 7. Their owners may do with them very much as they please, except, of course, as regards the protection of the forest from fire. At the present time the total area of the Adirondack and Catskill Parks combined, is about 4 million acres. The State owned land within these two regions, the forest preserve lands, amount, as has already been said, to 2,193,627 acres.

Of the four million or more acres of abandoned farm lands in New York State, about half is estimated to consist of old fields and pastures or otherwise open land, subject to, and because there are few or no seed trees on it, in need of forest planting. These areas are found in many of the counties of New York, outside the Metropolitan region and the section of rich agricultural land in the Northwestern part of the State. It is true that there are probably one million acres of sub-marginal abandoned farm lands in the state other than in the Forest Preserve counties. Here is where are located the lands so far purchased, under Chapter 195 of the Laws of 1929. But within the Forest Preserve Counties are other areas, not required either now or later for forest preserve purposes, that are in equal, if not greater need of re-

forestation. Further, under the 500 acre block clause in the law, the lands outside the Park boundaries in the Forest Preserve Counties offer some of the best opportunities for reforestation by the State.

The purpose of Part 2 of the Hewitt Amendment is, then, to permit the State to buy lands in these counties, outside the Blue Line for the creation of "production forests" from which in due time the timber can be cut and sold. It in no way changes the status of the state owned forest preserve lands within the Blue Lines of the Parks, as those now stand, or as they may be extended by law.

A bill now pending before the New York Legislature may, if passed, expand this year the total area of the Adirondack Park, by modifying outward the location of the Blue Line. But this bill, while it is tied up with the Hewitt Amendment, is not essential to it.

(This bill has become law as Chapter 95 of the Session Laws of 1931. It increases the total area of the "Adirondack Park" to 4,604,000 acres.—EDITOR.)

The Forest Preserves can and will be increased through further acquisitions, paid for from especially allotted Forest Preserve funds, made available by appropriations or bond issues. The preserve lands will continue to serve the purposes of recreation and watershed protection, as they now do. The lands acquired under the Hewitt Program will be entirely distinct, both in purpose and in location from those of the Forest Preserve and will constitute "Production Forests" designed primarily and especially as sources of timber and of wood, operated under forestry principles, for economic returns, and ultimately yielding a revenue to the State. Pennsylvania, fortunately, has no such provision in her Constitution as Article VII, Section 7 of New York. But in New York it is necessary to amend the Constitution in order to set up Production Forests in the Forest Preserve Counties.

While primarily established as timber producers, the forest plantations under the Hewitt Laws will also serve other useful ends. Among these are the increase of forest cover on the catchment basins of the watersheds of certain streams; the uses that some at least of these forests will serve in connection with wild life conservation and game management; and incidentally, but nevertheless not to be overlooked, because these new forests will add to the beauty of the State, an item of increasing economic importance in these days when what-

ever attracts the tourist and visitor is rightly to be reckoned as an asset.

The State of New York has long been noted for the intensive development of her forest parks, not alone in the Adirondacks and Catskills but as well in the local forest park systems that now cover the entire State. She has long been a State in which tree planting has been actively practiced, by the State Government itself, by counties, cities and towns, and by the owners of private lands, both large and small. In inaugurating this new statewide reforestation program, New York is embarking on a project that ranks with the most ambitious reforestation enterprises ever undertaken by any of the countries of the world. It has indeed much in common with the great afforestation program of Great Britain, now successfully going forward in its second decade. It has certain resemblances to the extensive forest planting that has been done by France.

To get the New York Reforestation Program fully under way will require material expansion of the state nurseries (eventually the annual production is to be 125 million plants a year), an army of tree planters trained and skilled in their work, and the solution of innumerable problems, both technical and administrative in character. The New York State Conservation Department faces no light task as it undertakes this work. This is fully realized and every effort is being made to lay down plans that shall be adequate to meet the needs.

For all these reasons interest attaches to the New York Reforestation Program. It is well worth watching, for as it comes to be carried out it can not but have a marked influence on the reforestation work that is already being done by other states and by the Federal Government, in the effort to restore to productive use the lands that serve the highest use of which they are capable when they are made, under forest management, to grow successive crops of economically valuable forest trees.

PITCH PINE AS A RAIN-MAKER

By George S. Perry

ON the elevated plateaus and mountain slopes of central and southern Pennsylvania, pitch pine trees standing individually and in clumps are a common feature of the landscape. They are most frequently noted on the drier sites where forest fires have ravaged the land again and

again until scrub oak and other brush growth forms the main forest cover. Such areas are called locally "scrub oak barrens." It is there that these hardy pines, because of fire resistance, often tower 40 to 60 feet above the dense brush growth about them. It was in this type of forest cover, on the nearly flat tableland of Snowy Mountain, four miles from Mont Alto, Pa., that the below cited observations were taken.

The drought of 1930 is historical. It persisted over into the early months of 1931. Every month in 1930 except March, was deficient in precipitation. The autumn of 1930 was notably dry. The table below from the weather station at the Forest Research Institute at Mont Alto, shows the actual rainfall measured during the three weeks that preceded the date of the study, which was December 8, 1930.

TABLE I.

<i>Rainfall by Days, from Nov. 19 to Dec. 8, 1930</i>	
Nov. 20.....	Trace
" 23.....	.01 inch
" 24.....	.03 inch
" 26.....	Trace
" 28.....	.05 inch
Dec. 2.....	.48 inch
" 6.....	Trace
Night preceding, " 8.....	.05 inch

Total rainfall in three-week period.... .62 inch

On two or three days preceding December 8, especially on the day or two immediately before, heavy fogs veiled the mountain slopes and summits. It was from these fogs that the pitch pines screened or raked out the considerable quantity of moisture measured in the study. During these foggy days, deer-hunters who were in the woods remarked about the steady drip of water from the large pine trees. The litter beneath such trees was thoroughly wet down while under the low brush around it was nearly dry enough to propagate a forest fire.

When the soil and litter samples were collected about noon on December 8 at an elevation of 1970 feet above tide, the dripping water and ice that had fallen from the trees had frozen to a depth of from a quarter to a half inch on the litter under the pines, but around about the forest cover was quite dry.

In collecting material for investigation, two representative pine trees were chosen. Tree A was 9 inches in diameter breast high and about

35 feet tall. Tree B was 16 inches in diameter and 40 feet tall. Both stood on nearly level ground. A was surrounded by pure scrub oak growth, while young rock oak fire coppice 12 to 15 feet in height grew around tree B. From beneath the crown of each tree two samples were taken, and two more for check purposes from a point about 40 feet distant from the base of the tree. Two samples taken at each spot were: (1) the fine litter and duff or humus, and any ice present, for the top down to mineral earth; (2) the mineral soil down to a depth of four inches.

The samples of soil and litter were carried to the laboratory in air-tight jars and weighed at once, then they were slowly dried to air-dry con-

late into the soil and result in the mineral layer showing a higher water content.

Under the second tree (B) the mineral soil sample had a lower moisture content than was found in the check sample from beneath the young rock oak nearby. There would have no doubt been considerable more moisture in the mineral soil beneath the brush, than beneath the trees, had not the latter extracted moisture from the fog laden air during the few days just preceding this study and added it to the soil. The leafless hardwood trees and brush transpire very little water, but the dry winds of autumn abstract considerable from pitch pines with their crowns fully exposed to every desiccating influence. The trees therefore

TABLE II

Moisture Content of Soil, Humus and Litter Under Pitch Pine and Brush

Designation of Soil Samples	Original Weights (gms.)	Air-dry Weights (gms.)	Water Loss on Drying (gms.)	Moisture Content % Wet Basis	Air-dry Basis
Tree A—Top	266.5	115.5	151	56.7	130.7
Tree A—Mineral	656	553.5	102.5	15.6	28.2
Check—Brush—Top	286.5	167.5	119	41.5	71
Check—Brush—Mineral	724	648	76	10.5	11.7
Tree B—Top	181	55.5	125.5	69.3	226.1
Tree B—Mineral	727.5	643.5	84	11.5	13.1
Check—Brush—Top	235.5	137	98.5	41.8	68.1
Check—Brush—Mineral	580	510	70	12.1	13.7
Averages—					
Tree—Top	223.8	85.5	138.3	61.8	161.8
Tree—Mineral	691.8	598.5	93.3	13.5	15.6
Brush—Top	261	152.2	108.8	41.7	71.5
Brush—Mineral	652	579	73	11.2	12.6

dition at room temperature. The appended table shows the moisture contents found for the several samples studied. As nearly as possible, the samples were taken from a 4 inch x 5 inch rectangle.

The area where the above samples were taken has not been burnt over since 1917. The duff or humus layer beneath the undecomposed leaves and needles is very thick and felty. Computations showed at least 100,000 pounds (50 tons) of fine litter, peat or duff and admixt mineral soil per acre on this site on a dry weight basis. This is higher than is usual on soils of the class present here, but will be used for the comparisons made hereafter. Naturally if the moisture were not retained in the litter and duff layer, it would perco-

withdraw enough more water from the soil than the brush cover at this season, so that the areas beneath the trees would be logically the driest spots in the locality, if water raked out of passing clouds by physical action of the pine crowns did not more than replace the losses due to greater transpiration.

The table shows that the humus and litter under the pines on the day of the study contained capillary and gravitational water to the extent of at least 160,000 pounds per acre, while the mineral soil down to four inches deep contained at least 208,000 pounds, making a total of 368,000 pounds or 44,045 gallons of water.

The brush land contained per acre for the humus

and litter only about 72,000 pounds of free moving water, with 168,000 pounds in the upper four inches of mineral soil, making a total of 240,000 pounds or 28,725 gallons of water.

The difference in water content for the upper four inches of mineral soil and the litter layers was therefore at least 15,320 gallons per acre in favor of the soil beneath the pitch pine trees. This difference was all due to the prevailing foggy weather during part of three days just before the soil and humus samples were studied. Probably prior to these foggy days the soil under the pines was slightly drier than that beneath the low brush. The difference in water content above computed is equivalent to a .56 inch rainfall.

A three year study at Mont Alto showed that about one-third of all rainfall finally appears in the streams as run-off. This means that such an effect of pitch pine trees as we have described, would have added at least 5,100 gallons of water from each acre of pine forest to the runoff available to water users from a short three day period of foggy weather, when rain gauges showed but very little actual precipitation. Of course, five or six thousand gallons of extra water runoff from an acre of evergreen, compared to hardwood or brush forest, may seem trivial. But when we consider that there are in many localities 30 to 50 days annually during the winter and cooler seasons, when the mountains are more or less completely veiled in mists and fog, and further that the elevated mountainous area of many catchment drainages totals many thousands of acres, we see that a difference in composition of the forest cover on our higher mountains, as between pine or proper mixt growth of pine and hardwoods in contrast to brush, may easily mean the difference between overflowing reservoirs from steady streams on one hand and water shortage with dry springs and streams on the other.

Water is one of the basic needs of man. The supplies for domestic and industrial uses in Pennsylvania are inadequate now in many localities, while the demand constantly increases. Many present sources of water supply are contaminated with sewage, and mine or industrial wastes, so their reclamation and use in our homes is always expensive and often repugnant to the mind. The crystal pure streams and springs which flow from the bosoms of our rugged, majestic and solitary mountains are the ideal sources of potable water. Some mountain forests are possibly of as great or even greater value to mankind as catchment areas for water as for timber and wood production. However, the two uses are not at all antag-

onistic. These mountain lands merit exhaustive study from both standpoints.

Such evergreen trees as pitch pine in southern Pennsylvania, and red pine further north, are sturdy sentinels of the high crags, ridges, plateaus and slopes. They will produce more and better grade wood there than any other trees. They build a thicker water absorbing and conserving litter and humus layer than do hardwood trees. They transpire but a fraction of the moisture back into the air in summer that the hardwoods do when they are in leaf. Now we find they condense or "rake" considerable rain out of the fogs of winter, early spring and late fall, when rushing winds sweep across the high places of earth and proclaim the melancholy days, when deciduous trees stand bare and exert little or no influence on the saturated clouds that fly by and carry their treasures with them.

Expenditures to stop forest fires and restore good tree growth on mountain lands are, after all, an investment in future homes and health.

MINING COMPANIES FIND TREE PLANTING PROFITABLE

THIRTEEN mining companies set out 262,000 trees from the State Forest Tree Nurseries this spring. These included 67,000 red pine, 54,000 Scotch pine, 37,500 pitch pine, 34,000 Norway spruce, 27,500 white pine, 22,500 black locust, 17,000 Japanese larch and 2,500 white ash.

Mining companies are among the leading industrial groups of forest tree planters in Pennsylvania. Almost 14,000,000 trees have been planted by 109 mining companies since 1916. The mining industry is an immense wood consumer, a large landowner and a heavy importer of timber. Its total wood requirements in Pennsylvania are over 100,000,000 cubic feet, and exceed those of any other State.

Seven-tenth of a cubic foot of wood is used in mining a ton of anthracite coal, and one-third of a cubic foot is used in mining a ton of bituminous coal.

Don't leave a campfire burning, don't drop hot ashes into grass or leaves, don't throw away a lighted match. These are simple rules. Anybody can follow them—and for those who will not some way should be devised to keep them out of the woods, or to punish them for carelessness.—*Harrisburg Telegraph*.

PARK AND RECREATIONAL DEVELOPMENT

By J. M. Hoffman, Chief, Bureau of Parks

WE have to our credit great accomplishments in the field of forestry. Due to outstanding leadership the Commonwealth of Pennsylvania has assumed a preeminent position in the ranks of forest conservation, for future timber supply, commerce, industry, and scientific research. Our efficient system of protecting all the forests in our Commonwealth from fires entitles our leaders to be designated as statesmen of commerce. They also had the foresight to recognize the character and health-building agency of the forests, and established a system of recreational use of the forests that has resulted in great good to our citizenship. This work is in its initial stage and much remains to be done. With the changing order of our national life problems of immense importance have been placed on the shoulders of those managing Pennsylvania's vast public domain of millions of acres of land. The educational, recreational and inspirational value of our forests can no longer be of secondary or incidental importance. In fact, Pennsylvania forested hills near to our large eastern population of United States have already assumed a place of first importance as a vast playground for the people. The demands for building the social and aesthetic side of our people have increased to an extent that we are forced to supply greatly increased opportunities of parks for the proper occupancy of leisure time. In park management we have in view the development of the ideals, character and health of our citizens. We are concerned with the social sciences, child welfare, proper use of leisure time and the providing of an adequate State recreational program that will readily enable all the people to spend a portion of their time in attractive woodlands.

Forestry is the business of supplying through forest culture one of the essential elements of man's natural requirements. Park development is the business of aiding humanity to use adequately the free time made possible through our highly organized machine and industrial civilization. In the administration of land for timber production little consideration need be given to the aesthetic in any of the various developments which embrace roads, buildings, dams and trails. In park management all roads and trails must be studied with the view of bringing out the most beautiful and impressive landscape that the region contains.

Park management is the statesmanship of ideals,

character, health and all those associations in environment and education that improve the character and standard of our civilization, the aesthetic, social and humanitarian—man rather than money. Forest administration is the business of growing trees for lumber production. Trees as friends and companions of man are the aims of the park executive. When the forester decides that certain stands of mature timber representing the finest specimens of trees are ready for harvest and from a practical business viewpoint should be cut, the park executive will protest and say that these trees are worth more in a park for their aesthetic and educational values than they can be worth in board feet of lumber.

In establishing a program for any work it is well to determine toward what end we are planning. The distinction between park and forest administration is similar to the distinction between managing a 500 acre farm on which we grow wheat, corn and potatoes and a neighbor who has a 500 acre farm planted with shrubbery and ornamental trees, having provided artificial lakes, park drives and many other artifices of ornamentation and beautification.

Forestry is commercial—park development is aesthetic. We have real need for distinctions in the management of these two important phases of the development and utilization of our mountains, forests and streams. The park executive has all the duties peculiar to his work that are possible for him to properly administer. A forester's lot is equally full with a varied and important program. All park and forestry programs get their greatest impetus and support from the outdoor enthusiasts who are more park-minded than thinkers along the economic lines.

The forester is engaged in a study of reforestation, tree growth, tree diseases, scientific research, zoology, botany, biology, lumber utilization, most efficient manner of manufacturing saw logs into lumber, lumber markets, freight rates and many similar problems of economic and industrial importance. The re-establishment of the lumber industry which will again, be of greatest industrial importance to our Commonwealth.

You can't afford to buy high priced lands for growing trees for lumber production. Practical business considerations will require the purchase of cheaper lands where you have a natural regeneration that in most cases is easily worth the entire cost of the lands. Accumulative interest for many years before the timber is ready for harvest will probably make a large payment either for the land

or for the cost of planting it, prohibitive.

For park purposes we wish to buy lands that possess the most beautiful and impressive scenery and those located near to our centers of population, and naturally we are obliged to pay high prices for such areas.

The forester will be thinking about reducing freight rates by growing timber at home. The park executive will be thinking about the increased tourist travel resulting from making more attractive through advertising and the proper type of development, the unusual beauties of his own State. In the administration of a park the rangers or guides will be interested in telling the visitors as much as is possible and in an appealing way, the interesting story of birds, animals, flowers, trees, rocks and insect life of the woodlands shaping the appeal to the play instincts of the public. The forest is an un-indexed library with many books of closed pages to the average individual. The park executive will reveal in the most attractive and inviting manner possible this great fund of knowledge. He realizes that education must be had without the public thinking it is being educated. The park-minded individual sees the great masses of people in our cities greatly in need of contact with nature, knowing full well that guidance and interpretation of the interesting natural phenomena will add much to the value of an outing. The park executive is interested in the development of a sturdy manhood that will decrease the need for spending such large sums for paternalistic efforts on behalf of those who are not able to maintain themselves without State or county aid.

The park management in improving a forest area aims at maintaining or restoring natural beauty. Improvement cuttings on areas that are managed for timber production will consist in the removal of all inferior tree species which in many cases will result in cutting away certain trees that should be retained for their leaf coloring in the fall or because they are flowering trees or shrubs or because they afford certain seclusion to picnickers and provide food for birds.

Planning will not preclude the recreational use of lands that are set aside for future timber production nor will it mean that timber utilization on all areas set aside for park development will be impossible. By definite planning there will be less interference with the future cutting of timber and also more efficient and better park management. We need to manage our parks in such a manner as to secure certain revenues from concessions such as horseback riding, winter sports, central

store, dining room and other concessions. A charge may be made for exceptional facilities provided such as cabins and hotels, parking places and tenting grounds. Each park should supply free wood, swimming, nature trails, nature museums, nature programs of various kinds, thus creating an atmosphere both of physical comfort and mental stimulus that will increase greatly the popularity of our mountains and forests.

An extension of a park program will require that a careful examination of all lands be made within our Commonwealth so that we may secure public ownership for future generations natural forested areas of unusual scenic beauty, especially those containing the most impressive views, waterfalls, gorges, rivers, creeks, caves or other unique and interesting features including memorials, monuments and areas of exceptional historical interest and importance. The development of facilities and conveniences for the transportation, shelter, comfort and education of the people should be so designed and constructed as to retain as far as may be possible the naturalistic appearance of the park areas, surroundings and approaches and concealing the hand of man as ordinarily is visible in urban, industrial and commercial development.

We now have a splendid system of forest monuments which include areas of historical groves of trees and unique biological or botanical interest.

Pleasure travel in Pennsylvania has been conservatively estimated at \$185,000,000 annually. A considerable portion of this inflow of money to the trades people throughout Pennsylvania has been due to our forests. By the selection of areas especially suited for park development and by increasing the facilities and conveniences we can doubtlessly add greatly to the inflow of money.

By a full fruition of a thoroughly conceived program of development of our streams, lakes, gorges and mountains with which nature has so lavishly provided us, we will unfold to the average Pennsylvanian and to the world at large hidden treasures of scenic beauty.

Successful forest fire protection depends not only on the physical equipment such as fire towers, trails and telephone lines, but also on the attitude of the public. An awakened public fully appreciating the beautiful in nature will result in reducing the number and size of our forest fires.

More than half of Pennsylvania's 2,000,000 youths of school age are unoccupied during three months or their vacation period. We are most deeply concerned in the recreational and educational opportunities that are provided for these

boys and girls. If this free time is squandered in idleness or in character destroying activities, more injury will be done the individual than can be accomplished for their up-building during the school term. A recent survey of the organized camps in Pennsylvania, revealed the fact that only about 5 per cent of the boys and girls were afforded the opportunity of enjoying this educational medium. Those in attendance were the boys and girls from the well-to-do families and the under privileged, while the great middle class of American boys and girls found no means of attending an organized outdoor camp. A more elaborate State Park system will greatly increase the opportunities for caring for the boys and girls of school age during their vacation period. Whatever they learn concerning woods lore or the interpreting of the unindexed library of nature will remain of permanent joy throughout their life and this youth will become a real conservationist in the future.

The natural forest park makes a dynamic appeal to the emotions of mankind. The tree has always been an inspiration of men. The earliest form of religion, the Druids, worshipped the oak tree. The tree has always been symbolical in commemorating a great event. The most permanent treaty formulated by William Penn with the Indians is associated with the spreading elm. The South American Republics commemorated their peace by planting trees with soil from each country in a circle surrounding a peace monument. The greatest men of our American civilization, Washington, Lincoln and Roosevelt, received much of their inspiration and sturdiness of character from contact with nature. The benefits derived from contacts with nature are not for the selected few but for all. People may be influenced to a higher state of civilization by enjoying a portion of their time in the great outdoors in the forest areas with which nature has so lavishly supplied Pennsylvania.

We are spending vast sums for curing disease and taking care of the insane and destitute. Probably one-third of the cost of governments consists in some form of paternalistic efforts which are largely charity. No greater character building agency exists than our mountains and forests.

Our scenery is equal to the best to be found anywhere. Many, however, are not aware of the beauty of our woodlands until, through the eyes of others, they may see the grandeur of nature. The birds and streams provide the finest music. Here the Master Builder of the universe with infinite patience has created the music of the ages.

Delay in acquiring those areas that should be State Parks will increase the cost of establishing a State Park program. One of the greatest philanthropies of recent years in the United States has been the large sums donated for State and national park development by men of wealth.

NEW YORK ACQUIRES 40,000 ACRES FOR REFORESTATION UNDER HEWITT ACT

WITHIN the year 1930 the New York Conservation Department acquired more than 40,000 acres of land for development as production forests under provisions of the Hewitt law of 1929. The cost averaged \$3.70 per acre. The land acquired consists of 48 areas, ranging from 500 acres to more than 3,600 acres, in 14 counties. All the areas to which title has been approved have been planted, the planting requiring more than 7,000,000 trees. Planting costs per 1,000 trees ranged from \$2.05 for trees planted with the use of a machine to \$7.31 for trees planted by hand. All the new plantations have been protected against forest fires with fire lines consisting of six furrows each. The 45.27 miles of fire line required cost \$22.05 per mile. To protect the plantations of northern white pine from the blister rust, currant and gooseberry bushes were removed from 2,430 acres of land in the vicinity of such plantations at a cost of about 50 cents per acre.

In the year ending September 30, 1930, New York enlarged its State forest preserve by 40,142 acres, including 22,242 acres in the Adirondacks and 17,900 acres in the Catskills. These lands cost on the average \$9.33 per acre. The outstanding purchase of the year in the Catskills is a tract of more than 2,000 acres including the so-called Westkill or Deer Notch.

One of the most beautiful things to be found in nature is a burl that grows on some of the red-wood trees. The burl that takes such a wonderful polish and shows such bewildering loveliness of grain and whorls is a scab that has grown over a wound in a tree. The old-time lumberman left them to rot—or burned them. Some of the best ones now on the market are being dynamited from old stumps that were abandoned forty years ago. These burls are being sent to Germany by shiploads to be made into polished table tops. They are sold by the pound and it is not unusual for one burl to weight 3000 pounds.

FOREST LEAVES

AUGUST-OCTOBER, 1931



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THE PENNSYLVANIA FORESTRY ASSOCIATION

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Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

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EDITORIALS

Members are reminded of the Annual Meeting, which will be held in Philadelphia on Monday, December 14th.

On August 18th, at a meeting of the Pocono Forestry Association, State Forester Robert W. Stadden gave a talk, illustrated by an actual example, of the "shoulder tank" used for fighting fires and advocated the availability of more of these to combat fires. Such demonstrations remind us of the menace of forest fires and how they can be fought, while every association formed in the interest of forestry and each meeting of interested members, aids the necessary movement to plant more trees and to protect those which are growing.

Members of this Association and all friends of trees will be interested to learn that much interest has been aroused in an effort to preserve for the people the famous "Painter's Arboretum" in Delaware County. Our President has been active in this work and has joined with the officers of other organizations in petitioning the Delaware County Commissioners to consider plans for its public acquisition. Others actively interested are the Pennsylvania Horticultural Society, Keystone Automobile Club, Delaware County Chamber of Commerce, Pennsylvania Parks Association, Isaac Walton League of America, as well as school and civic bodies, nature clubs, etc.

On October 17th (Saturday) at 3 P. M., will occur the transfer of the Delaware Canal property between Morrisville and Raubsville to the Department of Highways. It is understood that a subsequent transfer will be made to the Department of Forests and Waters which will hold it in perpetuity as a State Park.

This forty mile stretch along this quaint old canal has long been famous as one of the loveliest and most charming spots in the State.

The Pennsylvania Parks Association are making arrangements for the meeting which will be attended by Governor Pinchot, who will have as his guest Governor Larsen, of New Jersey. Heads of the State Department of Forests and Highways,

officers of associations interested in the preservations of this region and members of the legislative bodies will be present. An open invitation is extended to all interested.

The meeting will be held at Neely's Mill, Bowman Hill, on the River Road between New Hope and Washington's Crossing.

NARRATIVE OF 1931 SUMMER MEETING

THE 1931 Summer Meeting was inaugurated with a banquet at the new Nittany Lion Inn at State College, which was well attended by our members and a number of friends from State College and Bellefonte—about 75 attending. Subsequently an evening meeting was held in the same hotel, at which we were welcomed by Dr. S. W. Fletcher, Director of Research of Pennsylvania State College. Our President, Mr. Samuel L. Smedley, responded, and in this issue their addresses are given.

The anticipated address of Hon. Lewis E. Staley, Secretary of the Department of Forests and Waters, had to be omitted due to Mr. Staley's inability to attend. Mr. R. D. Forbes, Director of the Allegheny Forest Experiment Station, gave one of his informative talks on "Virgin Forests a Priceless Heritage," and we hope to have his remarks on this in a later issue. Then Mr. L. L. Bishop, Forest Supervisor of Warren, spoke on "The Local Economic Influences of the National Forest." Following was an address on "Game Refuges and Public Hunting Grounds," by Mr. W. Gard Conklin, Chief of this Bureau. Mr. Conklin's remarks are published in this issue.

The next day (June 26th) the party left in the morning to visit the Alan Seeger Monument in Stone Valley, going through Logan State Forest under the direction of District Forester Mr. T. Roy Morton. Stops were made at Bear Meadows, the Pine Plantation, Table Mountain Pine and the Old Ranger Station, which is now a Nature Education Camp.

After lunch another tour was made, going to the Penitentiary Nursery (which is in charge of Mr. Eby), where the party was photographed, and then went on to view the Fish Hatchery at Pleasant Gap, ending the afternoon with a visit to

the estate of our fellow member, Col. Theodore Davis Boal. Colonel Boal had invited the party to tea and in this and other ways showed them a full and generous hospitality which made a delightful ending for the day. Members visited the shrine and were shown the chapel and its wonderful relics, reluctantly leaving to return to headquarters.

In the evening Mr. Walter D. Ludwig, Highway Forester of the Pennsylvania Department of Highways, spoke on "Pennsylvania Highways Beautiful," and Mr. George H. Wirt, Chief Forest Fire Warden, discussed with his customary clarity and force "The 1931 Forest Fire Situation." Then "Pennsylvania State Parks" were advocated by Mr. Ellwood B. Chapman, President of the Pennsylvania State College. Most of these addresses are "The Pennsylvania State Forest School," by Prof. J. A. Ferguson, Professor of Forestry at Pennsylvania State College. These addresses are printed in this issue. The meeting closed with an exhibition of lantern slides of "Logging on the Susquehanna," an unusually interesting group of photographs which must have involved much time and patience to get together.

An inspection was made of the State College Buildings, and the party then left for the top of Nittany Mountain, going by Pleasant Gap so as to obtain the view of the valley, and on to Penn's Cave, where the members enjoyed the mile long water trip through this cave with its unusual formations. Thence the route was to and through the Milheim Narrows, along Fishing Creek and over the mountain to Livonia for lunch.

In the afternoon an excursion was made through Bald Eagle State Forest under the guidance of District Forester, Mr. William B. Winter. Actual illustrations were noted of State forest lands compared to lands burned over five years ago, and of the results of incendiary fires, ground fires, the effects of repeated burnings, deer damage to sprouts, eradication of gooseberries to combat "blister rust," forest plantings of various ages (the oldest 20 years), a 2,130 acre fenced and protected game refuge, and crossing Sand Mountain, Buck Mountain and Winglebeck Mountain, thence to Voneida State Park and the Joyce Kilmer Monument, which terminated another enjoyable and successful Summer Meeting.

The city of Heidelberg, Germany, with a population of 73,000, has 5,175 acres of forest land. The hills were bare in 1600. The stand has more than doubled since 1847 and yields a handsome net income above operating expenses.

FALL ARBOR DAY PROCLAMATION

WHEREAS, Trees and their products are indispensable to the welfare of State and Nation, and birds are important factors in the production of agricultural and forest crops,

NOW, THEREFORE, I, Gifford Pinchot, Governor of the Commonwealth of Pennsylvania, do hereby designate and proclaim Friday, October 23, 1931, as Fall Arbor and Bird Day, to be appropriately observed by schools and people generally.

In trees most birds are born, in trees most birds spend part of their lives, and from trees birds obtain much of their food. So, in the classroom and in the home, and in parks and recreational areas, attention should be focused upon the countless benefits of beauty and service freely given by these friends of man. Since the General Assembly recently designated the hemlock as our State tree and the ruffed grouse as our State game bird, I urge study and consideration of these outstanding types of the hundreds of species of trees and birds that grace our Commonwealth.

Although an appreciation of trees and birds is highly commendable, it is only by deeds that we as a civilized people may increase our tree and forest wealth and extend our heritage of useful bird life. Accordingly, I further recommend as a practical measure of action for the coming observance the reforestation of idle and waste land, the planting of shade trees near schools and homes and along streets and highways, and the establishment of shelters where birds may obtain food and water. Especially, I urge that at least one tree be planted for each of the ten million people of the Commonwealth, to commemorate the two hundredth anniversary of the birth of George Washington, the Father of our Country.

GIVEN under my hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this fourth day of September, in the year of our Lord nineteen hundred and thirty-one, and of the Commonwealth the one hundredth and fifty-sixth.

GIFFORD PINCHOT.

By the Governor:

RICHARD J. BEAMISH,
Secretary of the Commonwealth.

The total area of State Forest land as of August 1, is 1,493,040 acres, 16.52 perches, acquired at an expenditure of \$3,587,454.25.

ADDRESS OF WELCOME

By S. W. Fletcher, Director of Agricultural Research, The Pennsylvania State College

PRESIDENT HETZEL had hoped to be with us tonight to extend to you the welcome of the College. I quote from a letter addressed by him to Professor Ferguson, under date of June 2nd: "I regret to have to advise that my present plans will take me to the Middle West at the time of this conference. I am sorry, as I should very much like to meet with this group. I hope, however, that in my absence, you will convey to the Association my sincere respects; my sympathy for the constructive work the Association is doing; and my appreciation of the courtesy and honor they show the College in coming to our campus for their meeting."

The Pennsylvania State College has a keen interest in this Association, not only because it is the pioneer state forestry Association of America, but also because it has been so fruitful in good works. We are not likely to forget that your honored former President, Dr. J. T. Rothrock, who is affectionately known as "The Father of Pennsylvania Forestry," was at one time Professor of Botany at this institution. It was Dr. Rothrock who influenced a young man by the name of Buckout to choose forestry as his life work. Dr. Buckout became one of the most inspiring teachers of his time. I am informed by Professor Ferguson that it was chiefly through his influence that forestry education was established at Penn State. So, from many points of view, the Pennsylvania State College is under obligation to this association, and is honored by your presence on the campus.

I shall not even attempt to picture to you the many and varied activities of this great State institution, in the several fields of endeavor represented by the different schools—Agriculture, Chemistry and Physics, Education, Engineering, Liberal Arts and Mineral Industries. You are somewhat familiar, I hope, with the service that it is rendering through resident instruction to some 8,000 Pennsylvania young people each year, including the summer session; and through extension teaching to about 25,000 others each year, in all parts of the State. You may not be so familiar with the service that it is rendering through research, which is the function of the College in which I am most interested. Here is a recent publication of the College, entitled, "Research in Progress," in which are listed the research activities of the

faculty for the current year. There are 438 research projects, which engage the attention of 264 members of the faculty. Many of these projects were initiated at the request of the arts, trades and industries of Pennsylvania. All of them have a vital relation to the expanding industrial life of the Commonwealth. It is probable that the service of the College through research will, in time, equal its service through instruction.

I call your attention particularly to the several research projects in the field of forestry, as reported in this publication. Professor Ferguson and his associates are conducting experiments on the reproduction of denuded forest lands, sample plots for growth and yield, farm woodlot management, factors affecting the flow of maple sap, and other studies that are of interest to this organization. Research in forestry is organized as part of the program of the School of Agriculture. Nearly three and one-half million acres of the thirteen million acres of forest lands in Pennsylvania are in farm woodlots. Land that is not profitable for use in agriculture, under present economic conditions, may revert to forest. It is reasonable to expect that, at some future time, under different economic conditions, this land may again be claimed by agriculture. So it is that, to a considerable extent, forestry and agriculture are inter-dependent.

The situation in forestry research, however, is somewhat different from that in agricultural research. The Agricultural Experiment Station of the Pennsylvania State College is the only research laboratory of agriculture in Pennsylvania; the Pennsylvania Department of Agriculture at Harrisburg is a regulatory, not a research agency. Three publicly supported agencies are conducting forestry research in Pennsylvania. These are the Alleghany Forest Experiment Station of the United States Department of Agriculture, with headquarters at Philadelphia; the State Forestry Research Institute at Mont Alto, and the Department of Forestry at the Pennsylvania State College.

I mention this not to suggest that there is any unnecessary duplication of effort—there is room for all. Even though the resources of each of these three agencies should be multiplied many times, their combined efforts would not answer the many pressing problems in Pennsylvania forestry. But I do wish to suggest to the representatives of the State Department of Forests and Waters, and of the Alleghany Forest Experiment Station, that the representatives of the Pennsylvania State College will be glad at any time to sit around a table

with them to consider means by which each agency may contribute toward a unified program of forestry research for Pennsylvania, working in harmony and cooperation, and not in any sense in competition.

I hold in my hands the first fruits of this spirit of cooperation, the manuscript of a proposed bulletin entitled, "The Measurement of Mine Props," by Arthur C. McIntyre, of this institution, and G. Luther Schur, of the Alleghany Forest Experiment Station. Each of these agencies has contributed to the preparation of this publication. This is the kind of cooperation that counts, and the public has a right to expect it of us.

You have a full program during the next two days, and a very interesting one, but I trust that you may find time to see something of the College. You will be impressed, I know, with the great advantages that it enjoys in its beautiful setting, in this fertile limestone valley, with its clear, running streams and green encircling hills. Not the least of the assets of the Pennsylvania State College is the great State Forest which you will see tomorrow, which stretches almost to the gate of our campus. It has been the means of refreshing and invigorating many thousands of the sons and daughters of Penn State. For this, we are under obligation mainly to this Association.

PRESIDENTIAL ADDRESS

By Samuel L. Smedley

OUR annual meeting is being held this year at State College. We meet in a rather new attitude of mind, for ordinarily we make a point of attempting to broadcast the importance of forest conservation to the neighborhood where we gather. But we have chosen this place this year with the conviction that a few days spent in the atmosphere of this great institution of study and research will broaden and stimulate our own interest in that cause in which we are so deeply interested.

For the past fifty years, those who had the vision of the importance of forest preservation carried a weighty burden. They had to chart the channels of an uncharted sea. This year has seen one accomplishment which may have far-reaching results. Largely through the efforts of Edward E. Wildman, who is director of science in the Philadelphia School System, and an active member of our association, the Board of Education of Philadelphia has installed a course of study running

through the Elementary, Junior High, and Senior High Schools, in which is stressed the importance of the appreciation and preservation of our trees and wild life generally. It seems likely that this course of study will be adopted for the Public Schools all over Pennsylvania.

If students with such a preparation come in any great numbers to an institution like Penn State, with its reputation for research not only in forestry but in other lines of economic significance, we may look forward to a time when a goodly percentage of Pennsylvania's population will be forestry-minded. Then will we see the fruition of our slogan, the "Restoration of Penn's Woods," spread over every hillside of available land in our State.

It would seem that many of our social and economic problems can be met more successfully through education of the children in our public and private schools than by legislation. A good instance of this was afforded when Chicago was contemplating the establishment of its now vast park system. For ten years before the question was submitted to the vote of the citizens, the schools taught the desirability of parks for recreational purposes. As a consequence, when it was finally submitted, the park ordinances were passed by an overwhelming majority. Today Chicago has over 50,000 acres set aside for parks and recreational centers and is connecting these by a series of parkways and boulevards.

Compare this procedure with Westchester County, N. Y., which was so near the metropolis that its citizens were compelled, by the necessity of sanitation, to reclaim the entire county. The stream valleys had become so foul with refuse of all kinds that the health of the various communities was at stake. Within the past seven years, \$65,000,000 has been spent to reclaim this area, with the result that it is now one of the most attractive areas in the country. The cost was high, though the land owners are immensely pleased with the advances in real estate values. It is far less expensive to protect than to restore. I love to recall the paragraph in Holy Writ, Proverbs 29: 18, the verse upon which President Hoover placed his hand when he took the oath of office: "Where there is no vision, the people perish; but he that keepeth the law, happy is he."

It has been said that trees carry certain historic records in their trunks. While on a recent trip to California, we visited the Mariposa Grove. There I learned that the rings of those trees chronicled weather conditions for the past 3,000 or 4,000 years. They noted that for many years before and after the birth of Christ, there were heavy

rains in our Western country, while records show that in the Eastern Mediterranean country there were years of plenty and prosperity.

Recently several large white oaks at Westtown School in Chester County were cut. Upon examination of the rings of these trees, they all indicated an excessive growth at a certain time. Upon checking up, it was found the date coincided with the building of the school, 1795 to 1799. At this time, many of the older trees were taken out for building purposes leaving the remaining trees unhampered by competition.

We had great hopes that the rings of prosperity for forest activities in Pennsylvania from 1931 to 1935 would show great growth, but I fear we are now doomed to disappointment. With a Governor who has a nation-wide reputation as a forester and a conservationist, we had great hope for wide rings, but owing to financial conditions, he has been compelled, to his great disappointment, to cut down the appropriation for the use of the Department of Forests and Waters to the lowest limit.

Our association has been active in introducing and supporting bills in the Legislature for additional appropriations and bond issues, but without result. I suppose we shall have to be satisfied in the thought that the recent legislation and Governor have provided us with a State bird, the ruffed grouse, and a State tree, the hemlock. As they represent the most beautiful in their respective classes I suppose we should approve their selection.

Just why they did not select a State animal. I fail to see, possibly the fact that it might lead to a lengthy argument as the men would naturally choose the deer while the ladies would stand pat for the fox or martin to adorn their necks.

For the past year, much attention has been given to our new forestry program, announced about a year ago, copies of which were printed and distributed through the generosity of a member of council with satisfactory results. Not only have the leaflets been received with appreciation, but they have brought us many new members, including two life members. We are strongly of the opinion that, with a little personal attention on the part of our members, very substantial additions can be made to our membership, a feature much desired if our work takes on the proportion it should.

There is much encouragement as we glance over the activities of various organizations the past year who have the conservation of our wild life at heart. Forestry in Pennsylvania has held its

own, but if sufficient funds are not available in the near future we are going to fall behind other States.

New York seems able to find unlimited funds for forest and State park extensions.

In Pennsylvania public sentiment has been so aroused to the importance of public roads that ample funds are forthcoming for their construction and maintenance.

With the untiring efforts of our State Conservation Society, the Isaac Walton League, Horticulture and Garden Clubs, last but not least our sister organization, the Pennsylvania Parks Association who celebrated their first anniversary at Valley Forge the other day at which time there was a most enthusiastic manifestation that it stood for opening the forest parks where the great masses of our population could see and enjoy them. This movement coupled with the efforts of our public schools to instruct our children in an appreciation of our wild life is going to have a telling effect upon future generations. Consequently a higher type of citizenship to which we call attention in Article No. 8 of our New Forestry Program.

The coming year is the psychological time for an outburst of enthusiasm on these lines, the 250th anniversary of the landing of William Penn, the founder of our great commonwealth. May we all rally around the slogan "Restore Penn's Woods as He found It."

GAME REFUGES AND PUBLIC HUNTING GROUNDS

By W. Gard Conklin, Chief Bureau of Refuges and Public Hunting Grounds

PENNSYLVANIA has long been recognized as one of the best, and probably the best, game State in the Union. This justifies the statement that her valuable wild life resources have been and are being managed under a rational, economical and practical system. In fact a system unequalled elsewhere. A game crop is being maintained, and certain species are increasing in abundance, to furnish sport for more than a half million licensed hunters. Predatory animals are kept within reasonable control, but without any intention of their complete extermination. To maintain an adequate supply of game for a large army of hunters, in a thickly populated and industrial State, is no small task. For the past quarter of a century, however, there has been a steady

increase of the more important native species, and several valuable foreign species have been introduced. Now the quantity of game annually taken in a lawful manner is valued at more than \$7,000,000. About \$1,000,000 are expended yearly by the Board of Game Commissioners in game conservation activities. A return of \$7.00 for each \$1.00 expended is in itself evidence of sound management.

A great many factors have played their respective important parts in placing Pennsylvania in the enviable position it holds in game conservation circles. I will not attempt to enumerate them, but they may be briefly summarized as follows: First, by regulating the yearly kill to keep it below the annual production. Second, by endeavoring to produce a maximum crop of game on suitable territory. In other words, using a well known forestry term, working toward a sustained maximum yield, which is just as important in game management as in forestry.

One of the important links in the chain of management is our system of game refuges and public hunting grounds, which we believe to be the best in the world. It is worthy of note that the ideas upon which the system is based originated in Pennsylvania and that the development was started more than a quarter of a century ago. It is granted that there were game preserves elsewhere, especially in Europe, but they were set aside merely to provide shooting for the wealthy, the poor not being given a chance. In Europe, hunting is a rich man's sport; in this country and especially in Pennsylvania, everyone has a like opportunity. Nowhere else is our system of game refuges and public hunting grounds duplicated, although many States of the Union are following our example and are making very good progress.

Game refuges are an assurance of a continued game crop and produce this crop at a lower cost than any other known method. When I speak of game, I mean wild game as contrasted to that raised on game farms under more or less domesticated conditions. It stands to reason that game produced within its natural habitat, in a wild state as nature intended, without apparent help of the human hand and which, in fact, seldom sees a human being, will be more cunning, illusive and thus provide better sport for the hunter than that raised on game farms. Please do not misunderstand me. I have no intention of criticising or condemning game farms. They are quite essential for the production of certain species, particularly birds needed to augment the native supply, or for the production of introduced species;

I believe, however, nature's production is more preferable for sport than that which might well be termed "hand reared game."

Our State has been successful in building up a huge game crop which belongs to the people as a whole, and which is held in trust by the Commonwealth and administered by the Board of Game Commissioners. That Board long ago realized their duty did not end with the production of game, but that they must also do whatever they could to provide areas where every licensed hunter would have a like opportunity of securing his share. In other words, public hunting grounds are essential if the people's interests are to be safeguarded. This is particularly important in the immediate vicinity of game refuges created and maintained from money donated—I believe that is a proper term to use—by the hunters themselves. I take it for granted all present understand that all Game Commission activities are financed by the hunters and that not a cent is obtained from general State revenues. In consequence, it is the policy of the Game Commission to surround each refuge with lands owned or under the control of the Commonwealth and on which all licensed hunters are privileged to shoot. This is one phase of Pennsylvania's game program seldom followed in our sister States. Perhaps it is not so important in some of the others, but we consider it vital in a populous State such as ours. Should the Game Commission not have control of lands surrounding a refuge there would be nothing to prevent individuals or clubs from acquiring or leasing those adjoining lands, posting them against trespass and thus appropriate to their own purposes game overflowing from the refuge established and maintained at the hunters' expense.

When the game refuge program was first inaugurated in 1905, refuges were established on State Forests. As hunting is permitted on State Forests, the public's interests were safeguarded. The time arrived when sportsmen felt that the system of refuges and public hunting grounds should be further extended and they saw to it that the General Assembly passed the necessary legislation permitting the Game Commission to buy suitable territory, designated State Game Lands. Still later, that is in 1927, they were responsible for the passage of a bill increasing the hunting license fee from \$1.25 to \$2.00, earmarking the 75 cent increase for the purchase of lands and for the creation and maintenance of game refuges and public hunting grounds. Since then, the Game Commission has allotted approximately \$200,000 a year to carry on a land purchase pro-

gram. The first purchase of State Game Lands occurred in 1920. Since then the Commission has taken title to a total of 260,000 acres, comprising 40 blocks and distributed in 28 counties of the State. In addition to this 40,000 acres are under purchase contract. In eleven years the Game Commission has expended for the acquisition of lands, including title examinations and surveys, more than one million dollars.

The question has frequently been asked why two State Departments as well as the National Government should be acquiring practically the same kinds of lands. It is a logical question, for the Game Commission and the Department of Forests and Waters and the National Government, are all acquiring forest lands. It is easily answered by citing two principal reasons. First, sportsmen are willing to "foot the bill" to buy lands which they feel belong to them. They take a personal interest and pride in those lands which certainly makes for a healthy condition of affairs. The second reason, and the most important from the standpoint of game management, is that State Game Lands will ultimately be managed along somewhat different lines than State Forests. The primary object of State Forests is to produce timber and to protect watersheds. The primary purpose of game lands is to produce a maximum game crop, the production of timber being of secondary consideration. To produce a maximum game crop will necessitate earlier cutting of timber than would be logical on State Forests. As a matter of fact, it probably will be necessary to sacrifice a certain amount of timber in order to furnish maximum food and cover for game, which would not be considered good management in the practice of forestry.

There is one other point concerning the management of State Game Lands which might well be brought out here. That is the question of camping and the leasing of camp sites. Camping on State Forests is advocated; whereas, on State Game Lands it is prohibited. To many persons this difference in policy may appear illogical. We believe, however, that the reasons are sound. State Game Lands, for the most part, are widely distributed areas of from 5,000 to 10,000 acres in extent. Few are smaller than 5,000 acres and in several instances, larger than 10,000 acres. Where a game refuge is created, usually the heart of a tract is used for that purpose, leaving a belt of public hunting grounds surrounding. Naturally enough, in no instance should a camp be permitted within a refuge area; so the only possible location would be on the belt of public hunting

grounds surrounding the refuge. Should camping by hunters be permitted it is readily seen what a scramble would take place for the few suitable sites. Would it not seem ridiculous to permit a variable chain or ring of hunting camps to surround a game refuge? That is exactly what would take place if the land were open to camping. And if hunters are not permitted to camp on lands which their money pays for it certainly would not be policy to grant such privileges for other forms of recreation.

Likewise, it certainly would be poor policy to grant camp site leases on a block of State Game Lands where a refuge has not yet been created, but where conditions in the future may make one desirable. If camp leases were granted now, hunters would naturally select sites having good water and where game conditions were best. In other words, the area most desirable for a refuge would be spotted with hunting camps. Before a refuge could be established those camps would have to be vacated which would result in endless criticism and bad feeling.

As a matter of fact, the Game Commission's holdings are entirely too limited to warrant the issuance of camp leases. It would not be possible to grant all requests so why grant any and be subject to criticism for showing partiality. The General Assembly in the Act providing for the acquisition of State Game Lands wisely withheld giving authority to the Board of Game Commissioners to grant camping privileges. The bill was a sportsmen's measure so it is apparent that sportsmen realized then the inadvisability of sanctioning camping. They have not changed their minds and until they do, there is little or no possibility of legislative authorization.

RESOLUTIONS

THE Pennsylvania Forestry Association feels that it is deeply indebted to Prof. Ferguson and his associates at State College for their untiring effort to make our meeting a success.

In gathering together so many noted speakers and in providing so liberally for our entertainment, he has made this one of the outstanding meetings in the annals of our association.

We desire to express to him our sincere appreciation and to assure him that the 1931 meeting is not only one of the most informative that we have had, but one of the most enjoyable as well.

The Pennsylvania Forestry Association desires to express its thanks to Colonel and Mme. Boal

and to express the appreciation of its members for the hospitality extended to them.

The afternoon spent at their home will linger in our memory as one of the pleasant events of our meeting.

Mr. President, I wish to propose a resolution of sympathy to our treasurer, Mr. Bitler, as follows:

The Pennsylvania Forestry Association, at their annual meeting, have learned with sorrow of the illness you are passing through. We now rejoice to learn of your improvement, and sincerely hope that your complete recovery will be in the near future.

Mr. President, I wish to propose a sincere vote of thanks to all those gentlemen who have shown their great interest in our association by preparing papers and taking part in our interesting program, and that our secretary be instructed to write a letter to each one personally, expressing our appreciation.

WHEREAS, Botanists and zoologists are strongly agreed that samples of natural habitats, unmodified by human action, are of incalculable value in the study of plants and animals and their relation to mankind; and

WHEREAS, The Forest Service of the United States Department of Agriculture, in recognition of this fact, has recently announced a policy of setting aside natural areas within existing National Forests for scientific and educational purposes; therefore, be it

Resolved, By the Pennsylvania Forestry Association, that it heartily commends this action of the United States Forest Service, and urges that the Forest Service make a vigorous effort to obtain additional funds, under the terms of the Clarke-McNary Act, for the specific purpose of purchasing natural areas, within or adjacent to National Forests wherever suitable areas are not already in government ownership; and be it

Further Resolved, That the Secretary of the Association is hereby directed to transmit copies of this resolution to the Forester, United States Forest Service, and the entire membership of the National Forest Reservation Commission.

State and private interests which control forests in the Northwestern States are planting clover to serve the purpose of fire breaks. Experiments have been conducted for several years and have shown that clover will remain green during dry weather and form a mat thick enough to impede fire.

PENNSYLVANIA PARKS

By Ellwood B. Chapman, President Pennsylvania Parks Association

FOR some time there has been a mistaken impression that there was something antagonistic between the administration of forests and the administration of parks. This is most unfortunate, as such a sentiment, could, at the most, represent the opinion only of a few individuals.

The demand for recreation has, within the last few years, grown rapidly and in recognition of this fact the Pennsylvania Forestry Association, at a meeting held in the early part of 1930, considered the possibility of extending the scope of its work to cover State parks. It was then decided by the Executive Council, and perhaps wisely, that it would be best not to depart from the original purpose of the Association; to advance the interests of forestry alone.

It was not until after this action had been taken that a number of advocates of outdoor life assembled and organized the Pennsylvania Parks Association.

Far from working at cross purposes, it is hoped that the two associations, which President Smedley has so aptly characterized as "sister organizations," shall work hand in hand, the Park Association supplementing the work which has been so capably handled by the Forestry Association during this long period of years.

We must all give credit to Dr. Rothrock, the father of forestry, for the splendid results obtained in Pennsylvania, with its present holdings of 1,600,000 acres of forest land. No small amount of credit is due our present Governor for the fire protection system which he initiated during his former administration, and to the Game Commission which has made our State a veritable sportman's paradise.

In the recreational field, however, we must confess that we have not kept pace with our sister States in providing the facilities that are so greatly needed. While other States have bonded themselves for millions for this work, Pennsylvania has contented itself with setting aside from its forest districts a few favored spots for parks and camp sites.

Apart from historic places, such as Valley Forge, Washington's Crossing and others, there has been no notable expenditure except for Cook Forest. A new era is dawning, however. Our good Governor has told us that he is "just as greatly interested in the recreational possibilities of our forests as in their commercial value." Our present



THE THREE SISTERS: TWO GIANT HEMLOCKS AND A WHITE PINE IN THE COOK STATE FOREST PARK.



THE BEGINNING OF LONGFELLOW TRAIL AT THE TOURISTS' CAMP IN THE COOK STATE FOREST PARK.

Photos Courtesy Department of Forests and Waters



NATURE'S CATHEDRAL: SUNLIGHT AND SHADOWS AMONG THE GIANT HEMLOCKS IN THE COOK STATE FOREST PARK.



HEMLOCKS AND RHODODENDRONS BORDER TOM'S CREEK IN COOK STATE FOREST PARK.



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HEMLOCKS AND RHODODENDRONS BORDER TOM'S CREEK IN COOK STATE FOREST PARK.

Secretary of Forestry and his associates, too, are most sympathetic.

Our aims are; to secure a greater measure of recreational use of our State forests, preserving their beautiful and scenic spots, and the acquisition of additional areas near our large centers of population.

Pennsylvania is second to none of the States in the East in its scenery and points of historic interest, but we have not made these beautiful areas accessible to the casual visitor. A notable instance is the Pine Creek Gorge in Leonard Harrison Park, in Tioga County, a beautiful cleft in the mountains, four and a half miles long and nearly 1,000 feet deep, one of the most impressive spectacles in the East. As one approaches the Gorge, he stands in awe as he gazes into its vast depths and sees Pine Creek a mere silver thread at the base of the cliffs, with miniature trains wending their way along its bank with their loads of bituminous fuel from the Pennsylvania coal fields, destined for New York.

A small sum spent here for the accommodation of visitors, a pure water supply and adequate sanitary facilities, would draw thousands from our own and other States. In other parks, too, the facilities are very meager and unequal to the demand. What we lack most is recreational areas near our large centers of population, such as New York has provided and such as we are working for here in the East and our Pittsburgh friends in the West.

We are fortunate in having succeeded in securing the passage of legislation authorizing the Department of Forests and Waters to receive and administer land for park purposes, the establishment of a State Park Commission and the passage of a modest appropriation bill. It is the purpose of the Pennsylvania Parks Association to co-operate closely with the Department of Forests and Waters, to point out to its officers the needs of the various sections of the State, and to call attention to its noteworthy scenic and historic spots.

We hope to enlist the interest and support of many public-spirited men throughout the Commonwealth who are willing to contribute their time, and in many instances, are willing to make gifts of money or land to this cause.

Our Association has been in existence but a short time, but we have, however, many notable and influential men among our members. It is our intention to build up our organization so that it may be a tower of strength throughout the State to aid in this good work.

There is a feeling on the part of many employers that the time has come when it is incumbent upon them to look after the health, welfare and happiness of their employees. What cheaper method could be found than to assist each State to provide facilities for bringing the masses from the cities out into the forests, where they can find the best of all tonics, the touch of Nature and the enjoyment of our great "out-of-doors?"

PLAN OF FORESTRY EDUCATION IN THE PENNSYLVANIA STATE FOREST SCHOOL

By J. A. Ferguson, Professor of Forestry, Pennsylvania State College

THE merger in 1929 of the two Forest Schools in Pennsylvania, the one at Mont Alto and the other at State College, made possible the development of a plan for the training of Professional Foresters that differs radically from that in effect in the other twenty-odd professional forest schools of the country.

The plan of forestry education that has been followed by these schools is the same as for technical training along other professional lines. This consists in giving freshmen and sophomore students a thorough knowledge of the fundamental sciences underlying the science of forestry and then to build forestry knowledge on that foundation in the junior and senior years. In some of the forest schools, students do not begin the study of forestry until the junior year. The plan in effect in the Pennsylvania State Forest School delays the study of some of the fundamental sciences until the students have an intimate knowledge of the forest.

The freshman year is spent at Mont Alto for the study of the forest at first hand. The students spend fully half their time in intimate contact with the woods. One day each week the students engage in all the activities of the Mont Alto State Forest and forest nursery under the direction of a forest officer. They learn how to lay out, construct, and maintain forest roads, trails, and fire lines, how to thin growing stands of timber and weed out undesirable species, how seedlings are grown in the nursery, how to reforest denuded and idle land, and how to manufacture forest products with portable sawmills. They become acquainted with the problems that confront a forest officer in charge of a State Forest and a State forest nursery throughout a whole year. One day each week

is spent in the study of the trees, shrubs, and the flowers of the forests. The students become acquainted with the birds and animals in the forest and the fish in the streams, and study methods of propagation and protection. They learn at first hand the many uses of a State forest. They learn how to survey tracts of timber and re-run old boundary lines with the compass. They augment the forest fire fighting force for the forests of the region and learn in the woods, methods of forest fire protection and suppression. In addition they spend one day each week in the woods in studying the life of the forest in all its phases and the many methods of estimating timber.

The object of this instruction is to make the students woods-wise and woods-minded and proficient in woods work, to fill their minds with illustrations of forests on which to draw in their future study of forestry, and to carry them as far as possible in the knowledge of forestry from a practical standpoint. Botany is studied by the students as a basis for their field work and mathematics and mechanical drawing as a foundation for surveying.

In other words the forestry students in the Pennsylvania State Forest School start their professional course in the woods, the laboratory of a Forest School. With the fundamental knowledge of the forest and practical knowledge of woods methods gained in the freshman year, students should be better able to appreciate the necessity for the study of fundamental sciences. They should realize that they have gone as far as possible in their knowledge of the forest from a practical standpoint, that further advancement can be made only with a thorough knowledge of the fundamental sciences.

The sophomore year at State College is devoted to securing a knowledge of such fundamental sciences as will enable a proper understanding of the fundamental principles of forest growth. Sophomore students study chemistry, physics, botany, geology, soils, surveying, English, etc. At the end of the sophomore year, the students again are taken to the woods for eight weeks on the Allegheny National Forest. Half of their time is spent in practical application of principles of topographic surveying studied throughout the year under the direction of instructors in the School of Engineering, and the remaining half to a study of logging and lumber operations and wood-using industries, to timber estimating, and especially to silvicultural studies. With their knowledge of fundamental sciences and silvics the students have a different conception of the forest than during the

freshman year, and are better able to appreciate and explain the causes and effects of forest growth and tree distribution.

At the beginning of the junior year, students elect one of four lines of study—professional forestry, lumber industry, wood utilization, or private forestry. High-standing students who show a natural inclination for some particular phase of forestry are, in addition to their forestry subjects, allowed to elect courses fundamental to future specialization. In this way the foundation can be obtained for future graduate study in forest research, forest soils, forest entomology, forest pathology, range management, forest economics, etc.

Senior foresters finish their studies at State College by April and then make a working plan. This brings together all the knowledge acquired and applies it to a specific tract of timber. The students make a complete topographic survey of the tract, a type map, a protection map, and a management map. This necessitates estimating the timber and determining growth and yield. On the basis of the information obtained, plans are developed for placing the timber on a basis of sustained yield so as to secure continuous revenue from the forest. Two months are devoted to this study by the entire class.

It is believed that this method of training freshmen and sophomore forestry students in actual contact with the forest will enable a deeper understanding of the technical courses in forestry studied during the junior and senior years and will result in professional foresters better able to apply the art of forestry in the woods.

The first and only polo ball factory in the United States was recently built and started operation in Ohio. Although American polo enthusiasts bought many hundreds of polo balls daily, they were all imported from England.

The polo balls are made from clear grained, well seasoned willow. A block of willow wood is placed in specially built lathes, which turn it first into a cylinder, then into a sphere. The "nubbin" or rough surface is smoothed off on a sanding disc. After being stuck on a pin rack, the balls are dipped into enamel, dried, and finally polished with soft woolen cloths. The finished polo ball measures $3\frac{1}{8}$ inches in diameter and weighs not to exceed five ounces.

Forestry studies have been conducted in Pennsylvania for more than 30 years.

ATTRACTIVE TREES OF WEST PHILADELPHIA

By Estelle English

THIS article includes a general survey of the trees of this section, with particular interest in the oldest trees found from 34th to 39th and Woodland Avenue and along Baltimore Avenue to 58th Street, formerly known as Gray's Lane.

There are fine old trees still standing in every corner of the city, which have seen many changes in their neighborhoods. What tales they could tell, of the forests and farm lands that were around them from fifty to a hundred years ago. Some might even boast of having sheltered the early settlers or even the Delaware Indians.

They could tell, no doubt, of the first streets that were cut through those primeval woods, of the red brick houses with their white marble steps and green shutters, of the children that played "hide and go seek" behind them. Most Philadelphians know that William Penn planned to keep as many of the trees as possible along the streets and in the residential gardens, and that Chestnut, Walnut, Locust, Spruce and Pine Streets were named in memory of those trees that had to be cut down to furnish wood and space to build the first cabins, as well as to teach future citizens of the need and value of those "denizens of the forest."

It may be taken for granted that the oldest trees in the various squares and parks throughout the city, began to grow in or are scions of the "forest primeval."

The picturesque beauty of these parks is due to their shapely trees. They also provide cool shade, fresh air, drinking fountains and resting benches, apart from the sunny, dusty, noisy streets. In park facilities, Philadelphia surpasses any other city of this country. Fairmount Park, with its thousands of trees, garden walks and drives within over 4,000 acres, as well as its rolling, wooded banks along the Schuylkill River, is not surpassed by any other park in the world. Several pages might be written about the first five parks laid out by William Penn, in his plan of the city, as well as a few of the later, yet old parks.

George Barton, in his delightful book, "Little Journeys Around Philadelphia," has written a chapter entitled, "The Ghosts of Washington Square," which is daintily illustrated, showing some of its old trees.

The Poplar and Maple have been the favorite shade trees in the oldest sections of Philadelphia. In recent years, the Sycamore or Plane tree, commonly called Buttonwood, has been planted in the new streets. It grows rapidly and provides shade in a few years. The Poplar, with its glossy dancing leaves, is an attractive tree, whose foliage is darker green than many of its neighbors. A healthy specimen of the Poplar stands on the northwest corner of 34th and Walnut Streets. It is at least fifty years old, and as it has been trimmed to have a broad, round top, instead of the usual apex, it is not so tall as its apparent age would warrant, and as others at the corner of 34th and Chestnut Streets.

There are a number of institutions of learning, homes for children, churches and cemeteries that are proud of their trees which were probably growing before, or planted when they were founded.

The University of Pennsylvania can boast of a few sturdy old trees and many young memorial trees. In the history of that hall of learning, by its Recorder, George E. Nitzsche, a few pages are devoted to the latter, which have been planted by various classes that have attended the University. A list of the names and numbers of the trees planted on Hamilton Walk helps one to locate them. The even numbers are on the south side and the odd numbers are on the north side of the walk, which is situated between the north and south wings of the dormitories. Through the kindness of the above named Recorder, the following information has been furnished for this paper:

A scion of the Penn Treaty Elm stands on the Campus, in front of College Hall. It was presented by General P. A. Oliver, and planted by Governor Hastings on April 10, 1896, under the auspices of the Pennsylvania Forestry Association. The class of 1899 erected an iron fence around it. As it is the only tree so protected, it can readily be noticed.

The scion of the Charter Oak, which was presented by the class of 1866, and which stood between College Hall and the Library, did not flourish, so it is no longer alive.

Mr. James Lambert, Superintendent of the Botanical Gardens, has furnished information about other trees on the campus and in the gardens. In front of College Hall, as one approaches the Library, stands a beautiful Elm tree. At the bend of the walk, going toward the 34th Street entrance, is a graceful Kentucky Coffee tree. It is often called Mahogany in this state, also Coffee Bean and it is an ornamental tree that

will grow almost anywhere. The avenue of approach from 34th and Woodland is shaded by tall poplars, elms and maples. They have been growing there since the Campus was laid out in the 90's. There are a number of Ash trees, a Catalpa and Elms near the hedge on Woodland Avenue.

A few steps below Spruce Street at 36th and through the arch, lead us to Hamilton Walk. Here we find an ideal quietude amid a great many trees of various kinds, providing shade not only to students in the dormitories on both sides, but to those passing by. The walk is about three blocks long. The first tree planting took place in 1895. The oaks and evergreens are always beautiful in winter with their snow-laden boughs.

The Botanical Gardens contain a miniature forest, winding paths through the wooded perfumes, stepping stones down to lower levels and the lily pond, as well as interesting hot houses full of flowers and plants of this and warmer countries.

The oldest known tree is the Paulownia, which stands in the angle of the Medical Building. Henderson's Handbook of Plants tells that it is an Oriental tree, a native of Japan, and it resembles the Catalpa, a well known native shade tree of the South, also found in India. The Paulownia was named after a Russian Princess, daughter of Paul I. Its beautiful violet blue spring flowers resemble the foxglove.

The Black Locust is about thirty-five years old and is growing near the green houses, rearing its graceful head aloft. There is a young Honey Locust not far away. The Weeping Hemlock, whose age is not known, was brought from Germantown in 1928. It is very beautiful with its drooping branches laden with feathery sprays of tiny needles, and it is not more than five or six feet high. It is near the path alongside of the hothouses.

There are Oaks, Maples, Elms, Poplars of both kinds, Evergreens, a Catalpa, a fine large Sycamore and a handsome Ginkgo tree, as well as numerous bushes, vines and flowers in the Botanical Gardens.

Woodlands Cemetery, the oldest distinguished burial ground of West Philadelphia, as well as Woodland Avenue, on which it is located, were certainly so named because of the abundance of trees within their boundaries. This fine old cemetery, whose ancient arched entrance faces 39th Street and whose eastern side slopes down to the Schuylkill River, was opened in 1840. Winding paths lead from the portals to the official building, which appears to be on the summit of a hill. It can be seen, however, as if on the level

from 41st and Baltimore Avenue. There are kept the records of the burial lots of many of the oldest and richest families of our city. A fine view of the cemetery and the old trees near the office and in the grounds, may be had from the suburban trains that pass along the west side of the Schuylkill. There is an interesting history connected with this noble mansion, whose main entrance faces the river. From its porch can be seen the manufacturing plants, the skyscrapers and homes of the east side, which tell of the progress that has known few halts in the "march of time," through our busy city.

The office building of Woodlands was the home of a prominent family in colonial times. As early as 1735, the Deputy Governor of Pennsylvania, William Hamilton, under grant of William Penn, was the first to live there. We can imagine the happy times spent within its walls, when receptions were held for the prominent men and women of those times. It was the residence of more than one generation of Hamiltons and there is a "blind" room reached by a secret stairway, in which George Washington was protected from the British during the Revolution.

At the side of the front entrance, is a Locust tree, which was brought from East India by Mr. Hamilton, who was a contemporary of John Bartram. The latter secured a number of rare plants and trees for the garden of Hamilton Hall, as he had just laid out his famous gardens in 1730.

There is a back porch on "Hamilton Hall" which opens into the office, and being on the level with the paths leading to it, we can imagine how the old-time coaches stopped there, as beautiful ladies and handsome gentlemen in rich colonial attire, alighted and were made welcome by the host and hostess. About fifty feet from this entrance, are two post-like relics of ancient trees. One is covered with ivy but the other is bare, stark and gray, their lives long ended, like the dead around them. A graceful ginkgo tree is near them.

There are a number of handsome trees near the entrance of Woodlands, that may be unnoticed as we enter, some of which are known by the superintendent to be over one hundred years old.

Just within the arched portals on the left, stands a wonderfully beautiful tree. It is a basswood, about sixty feet high, conical in shape, with lower branches that bend down to the ground. Its perfect leaves are a light green, in contrast to the tall majestic maple that raises its branches aloft in the shadow of the buildings on the east side of the gates.

There is an old Beech tree, with its gray bark and branches dense with small beautiful leaves. Near by on the right, is a very tall bald Cypress, with short scant branches, which forms a picturesque figure in the curve of the road, pointing to heaven like a Gothic spire.

Some distance west of the portals, and in view from Woodland Avenue, is another handsome Beech tree. In the spring, its gray bark and reddish buds are always beautiful against the blue sky.

As we must reckon the age of a tree by the number of its rings, and they cannot be counted unless the tree is cut down, we can judge its age by comparing its thickness and height with similar trees whose age is known. There are many other grand old trees in Woodlands not visible from the avenue, which were young when the cemetery was known as Hamilton Woods, and with proper care, they may live on for many years to come.

PENNSYLVANIA HIGHWAYS BEAUTIFUL

By Walter D. Ludwig, Highway Forester, Pennsylvania Department of Highways

JUST as Pennsylvania, the Keystone State of the Union, has pioneered and led the way in many of the vast and varied activities of State and Government, so she is doing in the matter of constructing and maintaining her highway system, now the third largest in the United States with over 13,500 miles. Texas, the largest State in the Union, with 18,500 miles, and New York, with almost 14,000 miles of State highways, are the only States having more mileage today than Pennsylvania. With the fulfilling of the pledge of Governor Gifford Pinchot to build 20,000 miles of rural roads, and this program already started on its way to completion, Pennsylvania will place herself far ahead of any other State in highway development. Under the able direction of Samuel S. Lewis, Secretary of Highways, this vast program of highway building is expected to be completed within the next four years, when Pennsylvania will have almost 40,000 miles of State highways, perhaps twice the mileage of Texas, the largest State in the Union, and will lead the States in highway systems.

Without a shadow of doubt, it is safe to say that more people see the highways and the roadsides than any other person or thing connected with State or Governmental activities. Thousands

of people have gathered to hear and see President Hoover, or Governor Pinchot, or other notables, or to attend some important event, and it is likely that a great majority of all these crowds travelled over a portion of the highways during their trip. Day and night the highways of the nation are being traversed by millions who, consciously or unconsciously, receive an impression of the highway system, the roadsides and the scenery unfolded before them.

The present vast expansion in highway development follows closely that of the automotive industry which dates back less than two decades ago. In the first place the main objective was to make an automobile which would satisfactorily perform under all conditions and likewise a highway which would enable the automobile to do so. Utility formed the basis of these objectives during the first phase of development. As these objectives were attained by both interests, more attention was given to outward appearances; more refinements in body style and the many other little things which make for convenience and comfort in our present civilization.

And so was born the idea of beauty consciousness in the minds of the users of the highways; so came the first faint demand that the roadsides have a presentable appearance and at least enough of that so that the sensibilities of the highway user were not offended. And so some primitive principles of forestry and landscape treatment had to be applied to the care of the roadsides to satisfy this growing demand of the highway user and the general public.

HIGHWAY FORESTRY

Not so many years ago forestry was confined strictly to the care and treatment of woodlands and forests and today this is the essential principle of the profession. But the advance of the profession had to keep step with other ramifications which have arisen in modern civilization and forestry has done so along with this trend, so that today there are so many different branches of the profession that the original forester might proverbially turn in his grave were he to come back to earth again.

But when one examines the situation carefully, there can be no doubt that the same general principles apply to the essential treatment of highway slopes and roadsides. The well known principles of forestry that a forest cover is essential and necessary to regulate and control the run-off of water and so to regulate stream flow

and to reduce erosion apply with equal force to the treatment of highway slopes and the roadsides. Assuming that proper construction methods have been used in the roadway itself, there is perhaps nothing more essential to the permanency of the highway itself than proper water control and drainage. The planting of trees, shrubs, vines and grasses on the highway slopes and along the roadsides not only serves to control the run-off of water and to reduce erosion, but it also covers the unsightly gashes and cuts which are the result of modern highway construction and so adds a touch of beauty and attractiveness to the roadsides.

Primarily, as in any other business undertaking general forestry included, highway forestry must stand on its own merits. It must show a final reduction in maintenance costs of the highways; beautification and attractiveness follow naturally. Through the removal of dangerous trees along the highways; through the removal of trees and other growth on curves and at other dangerous points to promote traffic safety; through the establishment of evergreen snow fences and through the planting, seeding and sodding of slopes, culvert entrances and the roadsides generally, highway forestry can and will more than justify its existence from a purely business standpoint. If added beauty and attractiveness, the natural result of these measures, could be judged from a material standpoint, the scales would be very much overbalanced, and if the weight of favorable comment from clubs, organizations and individuals all over the State and country were added, the scales would be broken down completely.

Highway forestry is an infant, hardly out of its baby clothes but a lusty infant nevertheless. The forestry unit of the Pennsylvania Department of Highways was organized in the fall of 1928. I have no information that any similar special unit was established in any of the States prior to that time, although general work such as mowing of grass and roadside growth was ordinarily done as a matter of maintenance procedure and formed a part of general maintenance costs in many of the States. Today 11 of the States have a special unit to care for the roadsides or have set aside a definite sum for this work, and perhaps more than half of the States are expending some of their road maintenance funds for this work. The Pennsylvania unit now consists of a Highway Forester, with headquarters at Harrisburg, who plans and directs the work, and a division forester in each of the eight original highway divisions. Under the proposed plan of reorganization of the department, made necessary to care for the additional

20,000 miles of rural highways planned by Governor Pinchot, the State has been divided into 12 highway districts and each of these will eventually have a district forester to care for the work of the forestry unit.

FORESTRY ACTIVITIES

The essential work of this unit may be divided into a number of activities which can be briefly classed as follows:

1. Planting of slopes and roadsides.
2. Seeding and sodding of slopes, culvert entrances and roadsides.
3. Cooperative plantings with various clubs, organizations and individuals.
4. Removal and pruning of trees to insure traffic safety.
5. Establishment of evergreen snow fences at points where drifts are constant during the winter.

During the two and one-half years of its existence, the forestry unit has planted more than three-quarters of a million trees, shrubs, vines and willows on the highway slopes to prevent erosion and to control the water run-off; more than 25,000 shade trees, evergreens and shrubs around the various storage sheds; more than 2,500,000 square feet of berms and gentle slopes seeded, and more than 2,000 trees removed to protect the highways and to safeguard traffic.

In order to secure coverage of the slopes as rapidly as possible, it is necessary to use such species as develop a vigorous root system or which produce roots from the nodes when in contact with the soil. Honeysuckle, Virginia creeper, barberry, iris and various vigorous grasses are used extensively for slope work and these are supplemented by the flowering shrubs such as the spireas, dogwoods, snowberry, coralberry, laurel, rhododendron and others which are commonly found throughout the eastern United States.

At the same time, every effort is made to preserve existing natural growth wherever possible. Desirable species of all kinds are taken care of during road construction and operations; the theory of preserving the growth already on the ground being very wise and economical. In some cases, whole avenues of stately old trees have been preserved, and many a venerable oak or other unusual specimen has been saved by a slight relocation of the road or a little change in the road line. Likewise, naturalistic effects in planting are being aimed at

so that the roadsides do not have a standardized look but unfold a changing panorama of what appears to be the natural roadside growth of Pennsylvania.

An unusual problem is presented in the treatment of steep slopes where, because of the very nature of the soil itself, washing and erosion tend to wash out the planting stock before it has had a chance to establish itself. Since most phases of highway forestry represent pioneer efforts and because there are at present few past experiences in any of the States to furnish any reliable guide, considerable experimental work yet remains to be done. It is well known how profusely and rapidly most varieties of willow sprout and produce vigorous root systems. This is particularly true of the common white and the crack willow. By setting heavy live willow posts, from 6 to 8 feet in length along the slopes in the ground so that not over a foot of post is exposed, it is hoped to produce a profuse root system and growing willow sprouts to prevent washing and erosion of the steeper slopes. The results so far seem to indicate that this work will be successful.

To make the roads more safe for the motorist, the forestry unit sees that dangerous trees and tree limbs are removed so that these do not fall upon the highways and perhaps cause serious accidents and even death. Trees and other growth are also removed on the inside of curves so as to afford the motorist a clear view of approaching traffic and so promote safety. Besides, many undiscovered and hidden views along rivers and streams have been opened up by the removal of trees and underbrush so that the public has a vista of unusual beauty unfolded before its eyes. This has been done especially along the Susquehanna and Delaware Rivers.

In order to assist in memorial and similar plantings of shade trees and other suitable planting stock the department cooperates with clubs, organizations and individuals in this work. Usually the cooperating agency furnishes the planting stock, while the department makes the planting plan, plants the material and maintains it, and otherwise assists in the work. Entrance plantings to towns, boroughs and cities have been made in this manner, as well as avenues of shade trees, plantings around springs and at other suitable and desirable locations throughout the State.

Who has not seen the white roses of York County or the red roses of Lancaster County, or the memorial roses approaching the National Cemetery at Gettysburg in Adams County? Who has not

travelled along a highway bordered with young thrifty oriental planes, oaks or maples? These and similar beauty spots are brought about through the cooperation of the civic-minded people throughout the State.

On July 1, 1929, the forest tree nursery of the Department of Forests and Waters, located along the Susquehanna Trail between Northumberland and Milton, was transferred to the Highway Department. This nursery consists of 102 acres and has been placed in excellent condition. Here is raised much of the planting stock used along the highways. The nursery furnishes this stock at about half the cost of the average commercial nursery, and it also insures that freshly dug plants can be taken by truck to the planting sites over the State and planted in the shortest possible time. It is possible that the majority of the planting stock used can be raised eventually at the department nursery. To take proper care of spraying from time to time a power sprayer outfit is kept ready at the nursery to take care of the eastern half of the State, while a similar outfit is kept at Franklin for the use of the western half of the State.

The work of the forestry unit has received most favorable comment all over the State as well as from many of the other States in the Union. It has been heartily approved and endorsed by many clubs, organizations and associations of all kinds over the State, particularly the women's organizations, the park and forestry associations and others of similar nature whose activities have to do with the outdoors. The Pennsylvania Motor Federation at its recent meeting in Williamsport endorsed the program of the unit and asked that a definite sum be set aside each year for this work. Excellent cooperation has been given by the Pennsylvania Outdoor Advertising Association in the removal and elimination of signs at points which the department considers dangerous to traffic or interferes with a scenic view.

While many States are spending considerably more money than Pennsylvania in roadside work, some as much as ten times more per mile of State road, yet the work here has been established on a firm basis of economy, ultimate reduction in maintenance costs of highway operation, and utility. The resulting beautification of the highways is the cumulative effect of these operations and is the result so much desired and now demanded by the people. While the forestry unit is a lusty infant it will soon grow into a full-fledged adult, taking its rightful place as an essential feature of all highway development.

CHEMISTRY OF WOOD

THE U. S. Forest Service has made some valuable studies on the chemistry of wood, and the following interesting facts are excerpted from its report:

New values for forest thinnings, unused species, and logging wastes will accrue when industry is able to take miscellaneous woods material and transform it into useful products in greater variety and on a larger scale than has yet been attained. The possibilities in this direction are indicated by the already huge output of such technical products of wood as pulp, paper, rayon, viscose, and lacquers; but the development of new and improved products and their commercialization is ultimately dependent not on chance discoveries but on the results of scientific research, seeking always a clearer knowledge of the material and its chemical relationships. This principle holds good throughout modern industry; it applies to wood no less than to metals, oils, foodstuffs, dyes, rubber, and textiles.

Significant progress was made in this year's study of wood cellulose. Research conducted by a member of the laboratory on furlough at the University of Upsala, Sweden, resulted in the first recorded determination of molecular particle sizes of pure cotton and wood celluloses in solution. A new scientific instrument, the ultracentrifuge, was used. Particles of the same size as those in cotton were found in wood cellulose, together with other particles in a definite series of fractional sizes. This is an approach to solution of the problem of the molecular weight of cellulose, definite knowledge of which is fundamental to an understanding of the chemical properties and transformations of the material.

By disintegration of wood with chlorine under the direct rays of sunlight instead of diffuse light the soluble part of the cellulose was largely increased and the solid residue diminished. The scientific value of this result lies in the new soluble fractions made available for analysis and study. From the immediately practical point of view, it may point the way to larger yields of pulp from wood by excluding light from vessels in the beating and bleaching operations.

Lignin, a material making up one-third the weight of wood, is at present a mere industrial waste, of practically unknown composition, with few if any uses and an urgent disposal problem. Yet if its chemistry were better understood, it might prove as rich a source of useful products as the once disregarded coal tars. It was discovered

that after all possible carbohydrates or sugarlike bodies had been removed from lignin, more of them could still be produced on suitable chemical treatment. If, as seems likely, these carbohydrates were not present in the original wood but were made by chemical action on the lignin itself, an important clue to the composition and properties of the material has been developed. This clue will be followed up in the intensive study of lignin planned for the coming year.

The chemical study of wood extractives was supplemented by an investigation of their influence on the mechanical properties of black locust, western red cedar, and redwood. In each species the heartwood, containing the extractives, was found higher than the sapwood in certain strength properties, the difference in crushing strength, particularly, being considerably greater than differences in weight would indicate. In shock resistance, however, there was some indication of an opposite effect.

Forest Service research in the field of naval-stores production has pointed out important improvements. Preliminary studies of the physiological differences between individual trees as resin yielders were conducted, and preparations for their enlargement are under way. Meanwhile, the facts already known are finding wider practical application. Florida naval-stores factors, in direct touch with practically all turpentine producers in that State and cooperating with leading Georgia factors, this year canceled all old lease forms and issued a new one stipulating that no tree under 9 inches in diameter shall be cupped. Numerous progressive operators took steps to reduce the height of chipping in their workings conformably with Forest Service recommendations. Similar results are following throughout the producing region.

One of the most unique and interesting forests in Pennsylvania is located in the Borough of Nazareth and belongs to the Moravian Church. It comprises an area of approximately 100 acres and is part of a 5,000 acre tract which the Moravians acquired in 1740. The land was sold to them by the famed evangelist, George Whitfield.

One hundred thousand forest tree seedlings, raised in the State Forest Tree Nurseries, have been planted on this interesting forest property and is an object lesson in reforestation. The entire Church Forest lies within the Borough of Nazareth. On the edge of the forest is an old Indian cemetery and in it are buried some of the Indians who inhabited that region.

DEPARTMENT OF FORESTRY
STATE COLLEGE
PA.

FOREST LEAVES

JANUARY, 1932



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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

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PRESIDENTIAL ADDRESS AT 1931 ANNUAL MEETING

WE had great hopes the year 1931 would see a material addition to the forest area in Pennsylvania, but on account of the unusual economic conditions throughout the country, it has been impossible to do anything more than carry on the routine of other years.

You will recall, at our last annual meeting, you authorized your president to appoint a special committee to assist, if possible, in acquiring in a public way the Painter Arboretum and the adjoining land belonging to the estate of John J. Tyler, and also to look after forestry appropriations during the coming session of the State Legislature.

This committee has been quite active as to the final disposition of the John J. Tyler tract in Delaware County. Two inspection trips of the property were made, one with representatives of a number of civic organizations, the other with county officials. All greatly appreciated the unusual possibilities that exist there for a public park. Two conferences were held with the trust company having charge of the estate. As yet nothing has been done, but we are not without hope that eventually this tract will be set aside in the interest of the public in some way.

In the original state budget for 1931 and 1932, only \$400,000 was set aside for the purchase of forest lands. Your committee introduced a bill for an additional \$1,000,000, also an amendment for \$15,000,000, ten million for forestry and five million for state parks, but without avail. This was particularly humiliating when, a little later, our neighboring state New York, with very little effort, voted \$20,000,000 for the purchase of abandoned farms for forestation and other purposes.

Your committee also used its efforts as far as possible to secure an appropriation of \$150,000 for Pennsylvania State Parks, but only \$50,000 was allotted.

It is hard to understand just why our state, which stands out as a leader in many state activities, has to take the position it does in regard to parks and recreation facilities for her citizens.

With all our disappointments, there are, however, certain activities in which we can take courage. There will be more trees planted this year and next and by more diversified interests than ever before in this country.

The year 1932 brings the 200th anniversary of the birth of George Washington. A number of nation-wide organizations are advocating placing millions of memorial trees to his memory. The American Tree Association have 10,000,000 in mind as their contribution. The National Nut Tree Planting Project, affiliated with the American Forestry Association, under the slogan "Plant Nut Trees from America's Shrine," are working with boy scouts and other organizations throughout the country to plant walnuts from Mt. Vernon as a suitable memorial to the Father of His Country. It is also the 250th anniversary of the landing of William Penn to whom memorial trees are most appropriately planted.

Again, there is being installed in the curricula of our public and private schools certain studies in which an appreciation of trees and conservation in general is being stressed. These activities will undoubtedly have a lasting effect on the rising generation.

By cooperating with the public schools of our respective neighborhoods, members of the Pennsylvania Forestry Association can greatly stimulate this interest among the children. It has been my privilege to take part in this local work the last few years at the Edgmont Consolidated School, Delaware County, Pennsylvania, and it has been most gratifying to see the interest that is being awakened among the children.

To stimulate interest in the Washington Memorial Planting, walnuts were procured from trees planted by George Washington at Mt. Vernon. The teachers prepared a program suitable for the occasion, including recitations of some of our leading poems on trees. A tableau depicting a scene in the life of George Washington was also given. Thirteen children were selected to represent each of the original thirteen states. Stakes were furnished with the name of each state thereon and its number in the order of signing the Constitution. As each child was called to receive his or her stake they gave a short historical sketch

of their respective state and what their principal industry was.

The County Superintendent and a few others present addressed the school, after which the nuts were placed in prepared ground on two sides of the play field, six on one side and six on the other, with Pennsylvania's nut at the angle to represent the Keystone State. A boy scout troop also participated in the exercises.

Last year, about 75 evergreens were furnished by the Department of Forests and Waters and the children planted them on a slope at the rear of the school grounds. As there was not enough space to plant a tree for each pupil, one was assigned to each family. In this way, each child has an interest in a tree.

I feel that this attention from a member of our association has a real value in creating an interest in trees among children, and is a thing we can do in our respective neighborhoods.

It has been our privilege on frequent occasions to learn of the activities of the Allegheny Forest Experiment Station through its director, Mr. R. D. Forbes. You will find the recent published report of the station most interesting. With our Pennsylvania Research Institute at Mt. Alto giving special attention to conditions in our state, we have every reason to anticipate marked advancement on the technical side of forestry. With all this awakening from so many different angles, it surely behooves our association which has been blazing the way for so many years to keep alert to its possibilities. Let our interest not only be a duty but a privilege.

It will take very little exertion for each member of this organization to find one new member, and that additional support and interest will go far towards enabling it to function in commensuration with its past accomplishments and future ambitions.

Delaware County had a sawmill in 1723; Franklin County had one at Falling Springs in 1730; Berks County had one near Reading in 1735; Northampton County had one in 1737; Philadelphia County had forty in 1760; Wayne County one in 1762; Lycoming County one in 1773; Allegheny County two in 1776; Lancaster County sixteen in 1786; Susquehanna and Crawford Counties one each in 1789; Wyoming County one in 1793; Warren County one in 1795; McKean County one in 1798; and Clarion County one in 1805.

OFFICERS AND MEMBERS OF COUNCIL ELECTED AT ANNUAL MEETING DECEMBER 14, 1931

President, Samuel L. Smedley.
President Emeritus, Dr. Henry S. Drinker.
Vice-Presidents, Robert S. Conklin.
W. B. McCaleb.
Edward Woolman.
Treasurer-Secretary, C. P. Birkinbine.

COUNCIL

Allegheny County, Frank J. Lanahan,
George M. Lehman,
Hon. Walter Lyon,
John E. Potter.
Beaver County, Robert W. Darragh.
Bedford County, H. B. Phillips.
Berks County, Mrs. Edward Brooke,
Dr. George G. Wenrich.
Blair County, W. A. Silliman.
Bradford County, Miss Margaret Stewart Maurice.
Bucks County Mrs. Elizabeth F. James.
David Burpee.
Cambria County, P. L. Carpenter.
Cameron County, Josiah Howard.
Carbon County, A. C. Neumuller.
Centre County, Theodore D. Boal.
Prof. J. A. Ferguson.
Chester County, Robert G. Kay,
Mrs. Frank C. Andrews,
Norman Ratchford,
Dr. H. A. Rothrock.
Clarion County, Hon. F. L. Harvey.
Clearfield County, W. F. Dague.
Clinton County, Charles Hogeland.
Columbia County, C. R. Woodin.
Cumberland County, J. S. Illick.
Dauphin County, W. Gard Conklin,
George H. Wirt.
Delaware County, Ellwood B. Chapman,
Herman Cope,
Edwin A. Hoopes,
Dr. J. Clinton Starbuck.
Erie County, Miss Dorothea K. Conrad,
George S. Ray, M.D.
Franklin County, Geo. S. Perry,
John R. Williams.
Fulton County, W. L. Byers.
Greene County, M. E. Carroll.
Huntingdon County, Mrs. J. C. Blair.
Indiana County, Hon. Joseph O. Clark.
Jefferson County, W. N. Conrad.
Lackawanna County, Mrs. J. Benjamin Dimmick,
Hon. L. H. Watres.
Lancaster County, A. L. Eby.
Lawrence County, Wm. M. Brown.
Lebanon County, William C. Freeman.
Lehigh County, General Harry C. Trexler.
Luzerne County, Dr. Alexander Armstrong,
Cornelius B. Kunkle,
F. N. Kirby,
William R. Ricketts,
Samuel D. Warriner.
Lycoming County, Henry E. Kirk.
McKean County, Elisha K. Kane.
Mercer County, George Rettig.
Mifflin County, F. W. Culbertson.
Monroe County, R. W. Stadden.
Montgomery County, Mrs. Albert C. Barnes,
Miss Mary Blakiston,
H. Gleason Mattoon,
Miss Mary K. Gibson,
Edgar W. Nicholson,
Dr. Henry K. Pancoast.

1931 ANNUAL MEETING

THE Annual Meeting of the Pennsylvania Forestry Association was again held as a luncheon meeting at the Hotel Adelphia, Philadelphia, where 45 members and friends met on December 14, 1931. We were again pleased to welcome and to have with us representatives of other organizations interested in our work.

President Smedley gave a brief address, printed in this issue, which was followed by the statement that the report of the Secretary would be printed in FOREST LEAVES. The Treasurer reported that losses due to the decease of older members and other reductions consequent to economic conditions had reduced the Association's income. To meet this condition and to obtain a balanced budget, the Council had decided to issue only one number of FOREST LEAVES in the latter part of 1931 and reduce the number of issues to four per annum. In this way, and due to the help of some special contributions, it was possible to close the year with a slight favorable balance. The detail of the Treasurer's report is printed in this issue. It was also stated that a special campaign for more members, which had been financed by one of the members, had brought in about 30 additional, several of which took life or perpetual memberships.

It had been anticipated that Hon. Lewis E. Staley, Secretary of the Department of Forests and Waters, would address us briefly on the work of his department, and he had planned to do this. However an unanticipated demand for his time that day prevented his attendance, and he sent to represent him Mr. George H. Wirt, Chief Forest Fire Warden. Mr. Wirt personally expressed Mr. Staley's regrets, and then in his informal and effective manner related some of the work and problems of the department.

The Secretary read a telegram from Mr. Staley, expressing his keen disappointment that his unavoidable absence prevented his attendance, also a telegram from Dr. Hugh P. Baker, Dean of the New York State College of Forestry, which said: "Greetings and good wishes to Pennsylvania Forestry Association at Annual Luncheon Meeting from New York State Forestry Association, from Dr. Joseph S. Illick and Hugh P. Baker, formerly in forestry work in Pennsylvania. We believe in necessity for opportunities before Pennsylvania Forestry Association. Congratulations on your fine record through years."

The Secretary announced the unavoidable absence due to illness of two members who had long

Montour County, H. T. Hecht.
Northampton County, Prof. R. W. Hall,
H. S. Snyder.
Northumberland County, Charles Steele.
Perry County, Benjamin D. McPherson.
Philadelphia County, Dr. J. M. Anders,
Richard L. Austin,
Samuel N. Baxter,
F. L. Bitler,
Owen M. Bruner,
Mrs. Brinton Cox,
W. Warner Harper,
Grover C. Ladner,
J. Franklin Meehan,
Eli K. Price,
John H. Webster, Jr.
Albert B. Welmer,
Edward E. Wildman.
Pike County, Hon. Gifford Pinchot.
Potter County, Harry E. Elliott.
Schuylkill County, A. C. Silvius.
Somerset County, V. M. Bearer.
Sullivan County, E. F. Brouse.
Susquehanna County, Francis R. Cope, Jr.
Tioga County, Paul H. Mulford.
Union County, Raymond B. Winter.
Venango County, S. Y. Ramage.
Warren County, Walter W. Beaty.
Wayne County, Hon. Alonzo T. Searle.
Westmoreland County, Hon. D. J. Snyder.
York County, Edgar P. Kable.

REPORT OF THE TREASURER

THE report of the Treasurer of the Pennsylvania Forestry Association for the year ending November 30th, 1931, is as follows:

DECEMBER 1, 1930 TO NOVEMBER 30, 1931

RECEIPTS	
Dues	\$1,566.00
Sales of Forest Leaves	37.90
Sale of Book	.50
Life Memberships	350.00
Advertising in Forest Leaves	14.00
Special Donations	563.12
Interest on Investments	764.27
Sale of Securities	2,100.00
Sale of Badges	2.50
	\$5,398.29
Balance Dec. 1, 1930—	
Current Account	\$224.44
Investment Fund	675.76
	\$6,298.49
DISBURSEMENTS	
Forest Leaves	\$1,307.17
Expense of Meetings	62.91
Campaign for New Members	297.00
Letters to Legislature	12.00
Salary of Secretary	600.00
Office Rent	600.00
Office Expenses	75.15
Securities Purchased	3,084.72
Printing and Postage on Annual Bills....	51.75
	\$6,090.70
Balance in Investment Fund	191.63
Balance in Current Account	16.16
	\$6,298.49
Total Invested	\$16,620.63

been active and helpful in our work, Miss Esther G. Leggett and Mr. F. L. Bitler.

The following resolution was presented and adopted by the assemblage:

"Resolved, That the Pennsylvania Forestry Association, assembled at its Annual Meeting, approves of the action of the Council of the Association in recommending to the State Legislature an increase in the Biennial Appropriation for the Department of Forests and Waters, for the purpose of more adequate protection of the forests against the many recurrent forest fires, and to make this expenditure more in line with the actual fire hazard."

In connection with this subject, Mr. W. Gard Conklin, Chief of the Bureau of Refuges and Lands of the Pennsylvania Game Commission, spoke of their interest in and their methods of assisting in the prevention and suppression of forest fires. Mr. Edward Woolman referred to the regulations against smoking in the Canadian Forests, and urged that the amount allotted per acre for the protection against fire of our forests should be made comparable to the actual necessities; and quoted figures from other states. Mr. Edward C. R. Richards spoke of the greater care for the forests which is indicated and practiced in European countries.

Short addresses were also made by Hon. Robert S. Conklin, a former Forestry Commissioner, who urged greater activity by the Association, and Mrs. Joseph M. Caley, who as regional head of the Daughters of the American Revolution, expressed accord with our purposes and a desire to aid.

Following some informal discussion on forest fires, the meeting adjourned, leaving with those who attended a pleasant memory of a successful and interesting session.

The Versailles oaks, often times called the Pakenham oaks are being trimmed and treated for removal of dead limbs, cavities and other defects, by the New Orleans, La., Chapter of the Colonial Dames.

The Colonial Dames are greatly interested in the preservation of this beautiful grove of live oaks, considered to be the largest and oldest grove of live oaks in the United States, and cannot be surpassed for beauty by any other similar group of trees either in the South or in Southern Europe.

The Versailles oaks are seven miles below New Orleans on the edge of the battle field, on which Andrew Jackson conquered the British forces at the Battle of New Orleans, 1812.

1931 FOREST FIRE SEASON

By George H. Wirt, Chief Forest Fire Warden

IN presenting to you the story of the forest fire season which developed in the spring of 1931, it is necessary to keep in mind the fact that the spring of 1931, of course, follows the year 1930 in which existed what is said to have been the worst drought in the last fifty years.

It will be worthwhile, therefore, to review briefly the conditions which existed last year. Every month of the year except February and June was deficient in rainfall, so that at the end of the year in some localities there was an accumulated deficiency of some fifteen to eighteen inches of rainfall which constitutes at least one-third of the normal precipitation for the year. January, February and March of 1931 were also deficient in precipitation, although what fell was fairly well distributed.

During 1930 there were reported over 6,700 fires which is almost twice as many forest fires as we have ever had recorded in Pennsylvania in one calendar year since 1913 when we began to keep a complete fire record. Notwithstanding this great number of fires and the intensity of the season, our organization kept the total area burned over to a figure which is considerably below the total area burned over in several preceding years when neither the number of fires which started nor the intensity of the season was nearly as great as last year. The total area burned was approximately 312,000 acres which shows an average area per fire of less than 50 acres.

From the 1st of January, 1931, to the 8th of April there were reported to us approximately 500 fires. This was more than might be expected in a normal year. None of them amounted to very much and there was no reason to become alarmed about the unusual number. On the 9th of April, however, and from then on until the 22d, fire weather conditions developed rapidly. During this two weeks' period we had from 125 to 160 fires a day, in all totaling about 1,600 fires during the two weeks' period. On the 22d a general rain occurred all over the State and there was some let-up on the fire situation until about the 28th. From then until the 8th of May we had about 700 fires reported. This shows, therefore, that from the 1st of January until the middle of May this year we have already had to deal with more fires than we would ordinarily expect in a whole year that was not at all favorable to forest protection.

The foresters and fire wardens had to meet this situation considerably handicapped and these conditions, too, were the result largely of conditions which developed in 1930. Here I want to pay tribute to all of the foresters and many of the fire wardens for the great personal sacrifice which was made in their attempt to produce results not only in 1930 but in 1931. What these men went through physically and mentally during the last year and a half will never be really appreciated. The foresters stuck to their posts when some of them should have been in hospitals; forest rangers and inspectors literally had to be taken away from fire lines because of sheer exhaustion; and this spring at least six men were burned to death while fighting forest fires. Men went without food and without sleep for such periods of time that it was a wonder that they survived at all, yet they are all on the job today just as ready to tackle the new fire season as they have ever been.

Much might be said about the effectiveness of the forest fire organization in the spring of 1931, but again to thoroughly understand the situation we would have to keep conditions of 1930 in mind. Because of the strenuousness of the season of 1930, the forest fire organization was tried to the limit. Many fire wardens came through with considerable credit; others did things which apparently could not be accounted for and as a result of which they had to be dropped from the organization. The spring of 1931, therefore, found us with a number of experienced men who, as related above, did splendid work, but there were also a number of inexperienced men who naturally were unable to meet the situation as they will in the next few years. In a number of places our organization was incomplete and this made the burden of the older men that much greater. With all of these things it must be remembered that the unemployment situation has continued up to the present time, both last year and this spring. Men out of work apparently felt that as soon as forest fires started it meant a good chance to receive compensation. In some cases even without working. These men who were uncalled for by fire wardens, not only made the work difficult but unquestionably also increased the amount of work to be done, by reason of the fact that they could not be properly supervised. Certainly things were done on the fire line by such men which would not have been done had all the fire fighters been under the guidance of our wardens. Unnecessary backfiring unquestionably was done. Then when fires were out it was extremely difficult for the fire wardens to make up their bills in such a way as to eliminate all of

these men. This resulted in unnecessarily high cost of fire extinction this spring as well as all last year.

There was one more handicap which existed throughout the whole spring season. There never has been a time when we have had a sufficient amount of forest fire fighting tools to properly equip all of our fire wardens and forest fire fighting crews. The season of 1930 reduced our tools and equipment to a very great degree with the result that our fire wardens and their crews for 1931, in many instances, had to fight fires without any kind of improved fire fighting equipment. Efforts to remedy this situation were made just about the end of this spring fire season. About \$32,000 worth of forest fire fighting equipment was then ordered and will be available in plenty of time to equip the men before the fall fire season of this year.

With all of these conditions existing, the total acreage burned over in the spring of 1931 will probably not exceed 135,000 acres, which means that on the average the acreage burned has been held within a very reasonable limit, although far beyond what should have been burned. In order to contrast this devastated area with what is being reforested, I want to call your attention to the fact that this spring there was shipped from the State Forest Tree Nurseries 8,500,000 trees which at a thousand trees per acre would indicate that there was reforested in Pennsylvania this spring 8,500 acres. You can do your own calculating as to how long it will take the Commonwealth in its reforesting work to catch up with the destructive force of forest fires.

Now, just a little consideration as to the lessons which may be learned from our fire seasons of 1930 and 1931.

First, there is no question but that dry weather means forest fires in Pennsylvania. As a matter of fact forest fires will burn almost any time.

Second, forest fires must be controlled, which means prevention, general education, elimination of forest fire hazards, and just as important as any—law enforcement. Above all, forest fire control means trained men and adequate equipment. Our fire wardens and crews must be trained and supervised. The men must be well equipped and there must be adequate allotment made for this purpose.

The third lesson is that there must be cooperation between landowners, local governments and State and National governments.

The fourth lesson is that all of these things must result in the development of individual responsibility, which, after all, is the fundamental

basis of American life and liberty. Until our people realize that when they start into action a natural force such as fire, they must see to it that that fire, whether started within an engine, in a home, or in the open, is kept under control, and if it is not kept under control the individual who is responsible for its origin must be responsible for the destruction it does. This seems like a hard principle, nevertheless, as stated before, it is fundamental and after all, it is absolutely fair.

These lessons are not new. We have known them for years. The experience of 1930 and 1931 have written them indelibly in our minds and in our work. We need the help of every member of the Forestry Association to see that they result in improved conditions and in more promise for the protection of the forests.

A NATIONAL FOREST AS A LOCAL ECONOMIC FACTOR

L. L. Bishop

IN various States of the Union decisions are being made, and in the future will be made, as to whether or not new national forests shall be established or existing national forest units shall be extended. Those charged with the responsibility of making such decisions should weigh carefully the results that may be expected to attend. It is proposed in this paper to list the principal economic advantages and disadvantages of the carrying out of a national forest project. The question of national forest extension is most pertinent in the East at this time, and this paper is based largely upon Eastern or acquisition national forest conditions. By acquisition national forests is meant such forests as have been built up of areas of land acquired by the Federal Government for that purpose. Such forests are confined largely to the New England, Eastern and Southern States.

Although this paper deals specifically with national forests, it may be noted that with but few exceptions the economic results of managing a forest on a sustained yield basis are quite the same, be that area owned by the Federal Government, the State, County, a municipality, a corporation or an individual.

The scope of this paper is limited to the more obvious and tangible economic influences of a national forest on the local region. By local region is meant the area inside the national forest boundary and the territory within a few miles thereof. It is proposed to here catalogue the various in-

fluences (space does not permit of their being more than very briefly discussed), to show how certain unfavorable influences may be removed or mitigated, and to outline a policy as to Eastern national forest extension. The influences are to be grouped under several major subdivisions. In the main the headings used are Forest Service activity headings.

ACQUISITION

Once the location for the establishment of a national forest has been determined, the various steps looking toward the purchase of the land are inaugurated; offers to sell areas to the Government are solicited; areas that appear to be reasonably priced are examined, appraised and reported upon; options are authorized at prices which appear to conform to the policy laid down by the National Forest Reservation Commission; and upon authorization of purchase by the Commission, in certain instances prior to such authorization, the survey of lands is taken up. Concurrently with the survey or after the description is prepared a very thorough title examination is made. Once the title is reported as entirely good and the report is approved by the Attorney General a deed is executed by the vendors, placed of record in the local court house and a voucher issued in the amount of the total purchase price. The land then becomes a part of the national forest.

Through the carrying out of this acquisition procedure certain benefits accrue to the local region. The examination, survey and title work bring to the region trained specialists in each activity. They may or may not be married men. In either event they add to the local business through the purchase of supplies and equipment. Particularly as to the survey work, local men are given employment. The survey work done by the Forest Service is of very high order and often leads to the satisfactory settlement of land line disputes that would have been carried to court except for the impartial, painstaking work of the Service. Land lines common to the tracts being acquired and those yet in private ownership are carefully established without expense to the land owners.

The very careful title examination work carried on by the United States results in the discovery of many serious title flaws. It is always the policy of the title examiners to cooperate in the curing of defects. Such work benefits the owners of any land based on the same chain of title; for example, where only a portion of the original tract is

being sold and in cases where the owner reserves certain underground resources; Government title work often strengthens the title to adjoining tracts.

The examination, survey and title work done by the Government often costs a total of nearly \$1.00 per acre. Most of this amount finds its way into local trade channels.

Much of the land is acquired from local owners. In such cases the money received from the Government is available for use in the financing of local industry or for other productive purposes. The former owner is relieved of land taxes, nor does he have to carry the risk of the property being burned over and seriously reduced in value. Rarely does forest land return to its owner an amount equal to the carrying charges. In the vast majority of cases the land affords no current returns at all. In many instances the chance of a landowner to sell his hillside farm and adjoining woodland to the Government has made it possible for him to become established elsewhere and under conditions much more favorable, both as to net annual income and as to living and social conditions for his family.

FIRE CONTROL

Once a tract of land is approved for purchase it becomes the responsibility of the local forest force to protect it from fire. The meeting of this responsibility brings many benefits to the local community. The fire control standards set up for a given national forest area are very high. Federal protection work is always more or less closely coordinated with State and private protection work. The association of the two or more agencies in the one activity results in the raising of standards and the increasing of the effectiveness of each. A friendly spirit of rivalry spurs each one on. Since the Forest Service is a nation-wide organization many advances, such as new tools, new equipment, and new methods are being worked out by its members. Any improvements are made known to each forest supervisor and by him are passed on to each local cooperator.

In protecting areas of national forest, protection is necessarily afforded considerable areas of adjoining land. National forest fire protection work benefits the local region in the following ways:

- 1—Increases production of forest products.
- 2—Improves watershed conditions:
 - a—Less erosion of barren slopes.
 - b—Less silting of stream channels.

- c—Stream water more potable.
- d—Less water in streams during flood periods.
- e—More water in streams during drought periods.

- 3—Makes practicable effective forest management.
- 4—Improves recreational conditions.
- 5—Improves fish and game conditions.
- 6—Makes practicable long term forest research projects.
- 7—Makes practicable demonstrations of long term forestry practices.
- 8—Offers employment to local men as guards and fire fighters.
- 9—Gives added protection to property owned by others such as sawmills, camps, farm buildings, fences, gas and oil property, etc.
- 10—Tends to stabilize forest conditions and this attracts the favorable attention of persons and industries seeking new locations, and encourages those already located in the region to improve their properties or expand their operations.

ROAD AND TRAIL WORK

Once a new national forest project has been established the Forest Service addresses itself to the improvement of the local road and trail systems. Roads and trails are necessary for the proper administration and protection of national forest land, for the removal of forest products, and to make the area accessible to recreationists. The Forest Service works toward the betterment of existing roads and trails and the construction of such new ones as are necessary. The benefits which accrue through national forest road and trail work may be summed up as follows:

- 1—Travel and transportation conditions improved.
- 2—Improved construction and maintenance methods, machinery and materials demonstrated.
- 3—Higher standards of construction and maintenance set up.
- 4—Higher standards of effectiveness per man day and per dollar set up.
- 5—New types of road and trail structures introduced.
- 6—Local units relieved of a portion of road burden.

- 7—Encourages the many local road units to work to uniform standards.
- 8—Purchase of supplies and materials adds to local trade.
- 9—Affords work for local men and teams.
- 10—Attracts the favorable attention of tourists and recreationists to the region.
- 11—Better and more roads and trails aid in the marketing of local agricultural, forest, mineral and manufactured products.

IMPROVEMENTS

In addition to the construction and maintenance of roads and trails, the Forest Service regularly undertakes the development of the national forests through the construction and subsequent maintenance of such improvements as—telephone lines, ranger and guard stations, forest fire look-out towers and cabins, equipment depots, and the like. Forest Service telephone lines are made available for use by local settlers in so far as is practicable. They are always available in emergencies and often render very important services.

Construction and maintenance of forest improvements offer local persons work for themselves and their teams and are regularly built of material purchased locally. Such improvements are carefully planned and are built and maintained to a high standard. This has a tendency to raise the building and maintenance standard of the whole community. High standard improvements attract favorable attention to a region.

FOREST MANAGEMENT

The prime objective of national forest administration is the proper management of timber lands and forest resources. This objective may be briefly summed up as follows:

- 1—To bring about and maintain the most effective watershed protection.
- 2—To continuously produce forest products promising the highest net return in money value and improvement of forest capital by cutting mature, diseased, or defective stands, thinning where practicable to increase rate of growth, reforesting barren lands, and encouraging the closest utilization possible in view of economic conditions.

Scientific management of a national forest brings the following benefits to the local region.

- 1—Improves watershed conditions.
- 2—Provides continuous supply of forest products for use by settlers and industries, in other words, stabilizes forest conditions.
- 3—Increases the amount and quality of products produced by a given area.
- 4—Increases the per cent of most useful and valuable species.
- 5—Aids in the development of new and better uses for local forest products.
- 6—Encourages the use of new and better forest exploitation methods.
- 7—Through planting:
 - a—Increases total production of region.
 - b—Improves fish, game and recreational conditions.
 - c—Affords labor to local men, and increases trade by the purchase of supplies.
- 8—Encourages the proper handling of privately owned timberland.

One important result of all of the above is that it attracts favorable attention to the region, especially on the part of anyone interested in employment or industry which may be benefited by the stabilizing and increasing of the production of forest products.

FOREST RESEARCH

One function of each national forest organization is to carry forward as may be practicable forest investigation projects. These are for the purpose of adding to the sum total of knowledge necessary for the fullest realization of the forest management objective. As the results of such work are obtained they are put into practice on the national forest and disseminated for the benefit of all timberland owners.

GRAZING

To the extent that it is compatible with silviculture, grazing of national forest lands is permitted. Grazing privileges are granted on such basis as to make them attractive to stock owners. Local applicants are given preference. Ten head of domestic stock may be grazed on national forest land without charge. In many sections the ranging of live stock on national forest lands constitutes one of the most important and profitable industries. The grazing resources of a national forest are administered along the same lines as are followed in the administration of timber resources. Grazing conditions are stabilized and



VIEW OF ALLEGHENY RIVER VALLEY FROM DEVIL'S ELBOW



DESTRUCTION OF GROWTH BY PAST FIRES—MILLSTONE CREEK



SUMMER COTTAGE ON ALLEGHENY RIVER



GOVERNMENT-BUILT ROAD IN ALLEGHENY NATIONAL FOREST



VIEW OF ALLEGHENY RIVER VALLEY FROM DEVIL'S ELBOW



DESTRUCTION OF GROWTH BY PAST FIRES—MILLSTONE CREEK



SUMMER COTTAGE ON ALLEGHENY RIVER



GOVERNMENT-BUILT ROAD IN ALLEGHENY NATIONAL FOREST

the greatest practicable amount of forage is made continuously available, thus the local stock raising industry rests on a sound foundation. The availability of a local supply of live stock products tends to raise the standard of living.

SPECIAL USES

Areas of national forest land that are suitable for purposes that are more important than the growing of timber are made available, on very reasonable terms, for such uses. Here again the administration policy is such as to bring about the greatest good to the greatest number having especially in mind settlers and those who visit the forest for recreation. Most common special uses are sites for: picnic grounds, forest tourists camps, residences, hunting camps, summer homes, saw-mills, railroad rights of way, stores, hotels, power stations, and pastures. Under the terms of special use permits the rights of both the permittee and the public are safeguarded.

Many areas of national forest lands, which are of especial beauty and charm, are set aside solely for the enjoyment and delight of the public. This policy, together with that governing the special uses of other areas, cause the forest to be visited each year by increasing thousands and hundreds of thousands of recreationists. With these visitors come many benefits to the local communities. Industry is increased, new ideas are advanced, outside capital is often interested in local projects, and the earning power of many settlers is increased.

FOREST SERVICE PERSONNEL

Not all of the benefits of a national forest come directly through official channels. Benefits that accrue through forest officers and their families as individuals are important. Permanent forest officers are trained, carefully chosen men, most of them college graduates. Changes in personnel are more or less frequent. Forest Service employees and their wives, almost without exception, take a constructive interest in the social and economic welfare of the regions to which they are assigned. Each one that comes is apt to have new and helpful ideas that make for the progress of the locality. The tendency is that the standard of living be raised through the influence exerted by Forest Service personnel. Many contributions to the economic welfare of a locality have been made through suggestions and work on the part of forest officers. In many communities forest officers are among the most active and effective in

efforts organized for the purpose of increasing local industry, securing good roads, improving school conditions, and raising social and moral standards.

UNFAVORABLE ECONOMIC EFFECTS

There are instances in which the establishment of a national forest in some ways unfavorably effects the local region. For one thing, with the passing of title to the Government no more taxes are collected on the land. Part or all of the taxes formerly collected on the acquired area must be borne by the owners of the property still in private ownership.

The establishment of a national forest may tend to reduce the amount of local industry. For example, a private owner might be willing to dispose of very fine young growth timber as cordwood. Were the property sold to the United States it is probable that the policy would be to defer cutting until the stand had reached a stage when more material of much higher value and usefulness could be obtained from it.

A third possible unfavorable effect of a national forest is that the presence of such a forest tends to discourage the development of State, county or municipal forests. However, it appears probable that in nearly every instance the interests of the local region are better served through the medium of Federal forestry.

The unfavorable effects in any instance are few, are rarely of serious proportions and are of relatively short duration. There are many cases where very early in the history of a national forest project the direct financial benefits entirely or very largely offset the loss of taxes. Twenty-five per cent of the gross receipts of a national forest are paid to the counties in which the forest is located. An additional ten per cent is used by the Forest Service on the public road system of the forest. Nor are the expenditures of the Service on public roads limited to this ten per cent. The current annual allotment for road work to any one forest is apt to be many times the amount of the ten per cent fund. In instances such allotments amount to more than the total gross receipts of the forest. Most of the road work done by the Forest Service is on local public roads.

There are certain things that can be done to the end that there be little or no financial embarrassment to local political units through the loss of taxes: (1) Acquisition extended over a long period, thus permitting the necessary adjustments to be worked out gradually; (2) Use of road and

trail funds in such a way as to reduce the amounts that the poorer units must spend on their public roads; (3) Increase receipts by the forest through the sale of stumpage, issuing of special use permits and the like. In every instance the Government policy is to aid local townships and counties in every way possible.

There are cases where stumpage that was not available for use before it came into Government ownership has been placed on the market shortly after title has passed to the United States. In practically every case it is possible for the Forest Service to provide for the supplying of raw products to timber using industries that depended upon acquired property for their supply. Often it is practical to work out a plan which results in cutting only a portion of the stand, or a supply may be made available from mature stands located in other parts of the forest. The policy is to so manage acquired land that the least possible interruption of local industry results.

After all has been done that can be done, should certain unfavorable conditions obtain it is certain that with the land in Federal ownership conditions will steadily improve whereas with many areas, if private ownership were to continue, the reverse is apt to be the case. That the Federal Government is making a contribution to the satisfactory working out of local economic problems is given recognition by certain States through their making provisions for aiding certain local subdivisions through periods of financial stress caused in part by the loss of taxes on land acquired for national forest purposes. The Commonwealth of Pennsylvania is paying five cents per acre per annum to townships and counties based on the net acreage of State or Federal forest land.

CONCLUSIONS

On the basis of careful consideration of the economic influences of a national forest it seems that the conclusion must be that the favorable influences far transcend the unfavorable, and that any locality inherently suited to development as a national forest would, in the long run, serve a higher usefulness if so developed. Thus it appears that within the limits that may be determined as necessary, the policy should be to establish new national forests and to increase the area of those already existing in the eastern half of the United States. It is believed that in such a program the Federal Government merits the encouragement and cooperation of the several States and of local political units.

THE SCRUB OAK TYPE IN PENNSYLVANIA*

By Arthur C. McIntyre, The Pennsylvania State College

IT is estimated that over two million acres, or approximately one-sixth of the forest land of the State is occupied by the scrub oak type. The conversion of this type into stands of valuable trees is one of the largest problems that confronts Pennsylvania forestry.²

The type is confined principally to the light, shale and sandy soils, namely Berks, DeKalb, Upshur and Morrison, and is found extensively in the southcentral and northeastern parts of the State. It is the prevailing temporary type in the coal regions.² It has supplanted the oak-hickory and chestnut-rock oak-pitch pine types that formerly prevailed in these sections of the State. Two species of scrub oak, *Quercus ilicifolia* (scrub or barren oak) and *Q. prinoides* (scrub chestnut oak) give the type its name. They are commonly found associated on the moist and heavier soil types at low elevations; on the lighter soils and rocky mountain tops, *prinoides* is practically absent. Both species are intolerant of shade; only along roadways or in other openings within the oak-hickory and chestnut-rock oak-pitch pine types, where forest fires have not occurred, can specimens be found.

Q. ilicifolia attains a greater height and diameter and grows much more rapidly than *Q. prinoides*. The oldest and largest specimen of *Q. ilicifolia* known is thirty-five years old, twenty-five feet high and 6.1 inches D.B.H. Stands of scrub oak are dense and progress through them is difficult. This is due not alone to the great number of stems present but also to the crooked, seraggy growth of the species. Thirty-three tree species have been found associated in the scrub oak type. In these studies, the associated species were considered as to their value for restocking, desirability from the standpoint of silviculture and present economic value, hence they are shown under three classes in the following list. Only eleven species are found in large numbers.

Trees associated in the Scrub Oak Type grouped according to their silvicultural and commercial value:

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CLASS I

Most desirable

- *Red oak *Quercus borealis maxima*
- *White oak *Quercus alba*
- Black oak *Quercus velutina*
- *Chestnut oak *Quercus prinus*
- *Scarlet oak *Quercus rubra*
- *Hickory *Hicoria spp.*
- White ash *Fraxinus americana*
- Sugar maple *Acer saccharum*
- Sweet birch *Betula lenta*
- Yellow poplar *Liriodendron tulipifera*
- Basswood *Tilia glabra*
- White pine *Pinus strobus*
- *Pitch pine *Pinus rigida*
- Black walnut *Juglans nigra*
- Black locust *Robinia pseudoacacia*
- *Red maple *Acer rubrum*
- Beech *Fagus grandifolia*

CLASS II

- Black gum *Nyssa sylvatica*
- Poplars *Populus spp.*
- Butternut *Juglans cinerea*
- *Dogwood *Cornus florida*
- Ironwood *Ostrya virginiana*
- Gray birch *Betula lutea*
- *Sassafras *Sassafras variifolium*
- Blue birch *Carpinus caroliniana*

CLASS III

Least desirable

- Service berry *Amelanchier canadensis*
- *Witch hazel *Hamamelis virginiana*
- Striped maple *Acer pennsylvanicum*
- *Sumac *Rhus spp.*
- Hazel *Corylus americana*
- Fire cherry *Prunus pennsylvanica*

*Species occurring more frequently

The scrub oak type is temporary. It was fathered by fire and it continues to exist by the grace of repeated fires. Through the coal regions of the State, repeated fires have so favored the scrub oaks that many areas show less than ten stems of Class I tree species per acre. Such areas will require years of protection before they can again be made productive.

The scrub oaks are well adapted for their role of aggression following fires. Many dormant buds which occur at the root collars give rise to new growth when the main stems are destroyed. Often

twenty or more sprouts appear on one stump. The sprouts grow rapidly and promptly claim the burned areas.

In an extensive survey of the type, data were collected on seventy-two plots, transects or strips. As the survey progressed, it became apparent that repeated fires and their severity abetted scrub oak establishment. By determining the age of sprouts and making analysis of fire scars, it was possible to establish the approximate years when the fires occurred. On the average, most of the scrub oak type has been burned over every eight years.

In the accompanying table, data are presented showing the results of fire and general composition of the scrub oak type. As the time between fires increases, the number of stems of other species, over one-half inch D.B.H. increases, and the number of scrub oak stems decreases. When fires have not been severe enough to kill the larger trees, leaving a partial over-story, the proportionate number of scrub oak stems is less than where the stands were of uniform height. Plots 9, 11 and 13 illustrate this.

Scrub oak areas are extremely fire hazardous. This is due to the great number of dead stems, the large amount of ground litter, and the density of the stand as a whole. Firelines are essential in successfully combating fires. They not only break up large areas into smaller units, aiding greatly in the control of fire, but also open up the areas by facilitating travel, which is the key to successful fire suppression.³

At one time areas now claimed by scrub oak produced excellent stands of mixed hardwoods and conifers, remnants of which still may be found. Fire may have lowered site quality on these areas, but the growth of Class I species at this time is comparable to that on unburned areas. From data obtained on forty plots and from five hundred increment cores in average stands, thirty to forty years old, the current annual growth is estimated to be about sixty-five cubic feet per acre per year.

The commercial value of scrub oak stands at the present time is nil. They are useful, however, in protecting the site against erosion and deterioration. It is difficult to estimate the time necessary for new forests, composed of more valuable trees, to establish themselves unaided. A hundred years or more may elapse before normal stocking of commercially important trees will occur on areas that have been burned repeatedly and where scrub oak dominates almost to the complete exclusion of other species.

The reclamation of scrub oak areas by planting has been suggested. On areas where the number of stems of Class I and II species is less than two hundred per acre, planting or seed spotting is necessary if the areas are to be made productive within fifty years. The Pennsylvania Department of Forestry has experimented with planting in the type. Plots were cleared prior to planting; on adjacent plots, under-planting was tested. The cost of clearing was 45 man-hours per acre. Similar work by the writer cost 43 man-hours per acre. Clearing prior to planting is inadvisable because the new sprout growth, which forms immediately, is denser, making conditions less favorable for seedling establishment and growth than where no clearing was done. Byers¹ estimated that not more than a 15 per cent survival of 3-0 white pine seedlings can be expected. From similar studies made by the Pennsylvania State College, it is believed that a 25 per cent survival may be expected from 3-1 stock. Because of the density of scrub oak stands, under-planting is difficult. An average of five hundred seedlings per man per day is very good. Scrub oak is excellent deer cover and plantations are severely damaged by deer browsing during the winter and spring months.

Seed spotting, or planting well developed seedlings or transplants in small openings, without regard to spacing, thus taking advantage of the most favorable conditions, is being tried and gives promise of good results. In this way seed trees will be established which, in time will aid in converting scrub oak areas into valuable forests again.

If these areas are planted with white pine at the rate of one thousand seedlings per acre and mortality does not exceed 85 per cent, there will be approximately one hundred and fifty trees producing 45 cords per acre at 75 years. Estimated normal stocking is two hundred and sixty trees and eighty cords. On these same areas, where seed spotting or planting in openings is followed, the time necessary for the species so seeded or planted to produce seed in sufficient quantity to aid in restocking must be added. On a great many areas this plan seems to be feasible. The encroachment of the more valuable species will be slow if left to but a few scattered oak seed trees whose seed is not readily disseminated. Because of the number of rodents on these areas, the loss of the entire crop of acorns may be repeatedly sustained.

Seed spotting in some sections of the type can be carried on successfully only when poison in

some form is used to reduce the great numbers of mice and chipmunks. The labor costs of this work is twenty cents per acre when approximately fifteen seed spots are made. Planting costs will run about thirty-five cents per acre under the same conditions. On areas where fires have been less frequent or severe, average time for restocking will vary from five to fifty or more years. Given complete protection, it is estimated that satisfactory stocking of commercially important species will take place in from twenty to thirty years throughout 75 per cent of the scrub oak type. The forest of the first generation will come largely from sprouts; probably less than 10 per cent will be of seedling origin. Most areas will be under-stocked and the average current growth per acre will not exceed twenty cubic feet at thirty-five years. It is estimated that 75 per cent of the stems composing the new stands will have defects in them, mainly the result of fire.

Thus it is apparent that the returns from the areas at the first cutting will be small. Cordwood and small mine timber is all that should be expected. The owner of these lands must be satisfied for some time with progress toward the establishment of a well-stocked, productive forest through the elimination of scrub oak. Scrub oak species, because of their intolerance, will rapidly lose out as the crowns of the better class of trees take up the space. Heavy cuttings should not be made because openings in the crown canopy will again favor encroachment of scrub oak. Selection cutting, removing only the poorer trees and aiming toward a more uniform distribution of stems, should be followed. The control of fire and a wise management policy over a period of fifty or more years will accomplish much in again bringing these barren areas into a state of production.

SUMMARY

The rehabilitation of cut-over fire-scarred areas now occupied by trees of secondary silvicultural and economic importance is one of the big problems confronting forestry in Pennsylvania. Some 2,000,000 acres of forest land are dominated by scrub oak species having little or no commercial value. However, they serve a temporary purpose, that of soil protection, until more valuable species can again claim the site.

Many scrub oak areas have a sufficient number of the better class of forest trees which, if given protection, will replace the scrub oak in the course of 25 to 50 years.

Planting the scrub oak areas is not economically feasible at the present time. It is doubtful if more than 25 per cent survival may be expected.

Protection is essential if the extensive scrub oak areas are to be transformed into forests of value.

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THE NUMBER OF STEMS OF SCRUB OAK AND ASSOCIATED SPECIES UNDER AND OVER ONE-HALF INCH D.B.H. ON ONE-TENTH ACRE PLOTS ARRANGED IN ORDER OF YEARS SINCE LAST FIRE

Plot No.	Years Since Last Fire	Scrub Oak				CLASS I				CLASS II				CLASS III				TOTAL CLASS 1-2-3	PER CENT
		Under 1/2 Inch	Over 1/2 Inch	Total	Percent	Under 1/2 Inch	Over 1/2 Inch	Total	Percent	Under 1/2 Inch	Over 1/2 Inch	Total	Percent	Under 1/2 Inch	Over 1/2 Inch	Total	Percent		
1	2	2166	...	2166	61.97	694	10	704	20.14	345	2	374	9.92	278	...	278	7.95	1329	38.02
2	3	3914	4	3918	86.98	160	15	175	3.88	26	...	26	.57	376	9	385	8.54	586	13.01
3	3	3772	...	3772	93.02	145	46	191	4.71	13	...	13	.32	79	...	79	1.94	283	6.97
4	3	2426	11	2437	64.03	752	50	802	21.07	2	...	2	.05	544	21	565	14.84	1369	35.96
5	3	2333	13	2346	76.99	26	3	29	.95	65	...	65	2.13	606	1	607	19.92	701	23.00
6	4	830	96	926	45.57	30	6	36	1.77	180	6	186	9.15	870	14	884	43.50	1106	54.42
7	4	3786	203	3989	96.09	3	9	12	.28	25	5	30	.72	5	115	120	2.89	162	3.90
8	8	2006	409	2415	42.49	...	...	...	...	...	7	7	.12	3261	...	3261	57.38	3268	57.50
9	8	491	75	566	48.91	137	206	343	29.64	9	7	16	1.38	182	50	232	20.05	591	51.08
10	9	2099	356	2455	74.32	66	123	189	5.72	24	42	66	1.98	557	36	593	17.95	848	25.67
11	9	107	53	160	28.07	47	159	206	36.14	5	17	22	3.85	144	38	182	31.92	410	71.92
12	12	1293	257	1550	85.92	31	29	60	3.32	29	4	33	1.82	154	7	161	8.93	254	85.92
13	17	152	15	167	19.73	101	196	297	35.10	74	18	92	10.87	288	2	290	34.27	679	80.26
14	18	118	146	264	9.79	20	42	62	2.29	...	...	...	...	2268	102	2370	87.90	2432	90.20
15	19	286	165	451	17.50	228	123	351	13.62	72	97	169	6.55	1584	22	1606	62.32	2126	82.49
16	20	...	54	54	6.56	92	200	292	35.52	124	42	166	20.19	276	34	310	37.71	768	93.43
17	22	10	481	491	40.27	297	101	398	32.64	...	...	...	...	326	4	330	27.07	728	59.72
18	23	182	8	190	24.57	93	58	151	19.53	57	36	93	12.03	308	31	339	43.85	583	75.42
19	24	237	...	237	18.64	528	114	642	50.51	14	22	36	2.83	349	7	356	28.00	1034	81.35
20	25	591	7	598	46.79	288	170	458	35.83	25	9	34	2.66	175	13	188	14.71	680	53.50
21	34	55	4	59	4.82	423	277	700	57.18	97	20	117	9.55	291	57	348	28.43	1165	95.17

FLORIDA PINES BEAR HIDDEN MARKS OF HURRICANE

FIFTY longleaf pines in Western Florida that were cut in 1928 for study by the Forest Products Laboratory did not reveal by the positions in which they were then growing that they had been injured by the hurricane of September, 1926. Examination of their wood, however, revealed traces of the hurricane, known to have passed over the region where the trees grew. The annual ring for 1926 showed that growth was normal through most of the growing season of that year; but toward its outer edge appeared compression wood, evidently recording the bent position into which the trees were forced by the hurricane. The formation of compression wood continued through 1927; in 1928 it ceased in some of the trees and became less pronounced in others.

Compression wood is the abnormal type of wood that occurs on the lower sides of leaning trunks of softwood trees and on the under sides of their branches. It is distinguished from normal wood by the relatively greater width of the section of

the annual ring in which it occurs, and its summerwood lacks the normal hard, flinty appearance. As seen under the microscope it differs from normal wood in that most of the cells are nearly circular in cross section instead of rectangular or polygonal, and are separated at the corners instead of being completely joined one with another. Its cell walls, also, have spiral checks not present in normal wood. An outstanding characteristic lessening the usefulness of compression wood is the fact that its longitudinal shrinkage is from 3 to 35 times as great as that of normal wood. This excessive shrinkage frequently causes bowing, twisting, and splitting of softwood lumber.

Twenty years before the arrival of William Penn in 1682 the Dutch and Swedes had sawmills in their settlements along the Delaware River.

Russia is as big as the United States, Canada, Mexico, and the Central American States combined. The virgin forests of Russia cover an area as large as that of the entire United States.

WATER RESOURCES AND CONSERVATION OF FORESTS

By Warren E. Darrow
Consulting Engineer

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IN turning to the hydrometric method, it is necessary to emphasize that comparisons of streams by measurement of the flow are particularly liable to error. This method is greatly in use for reasons of swift advancement of industrial development and increase in population, and also because many do not realize how inaccurate results may be. However, stream measurement serves many other purposes, when accurately taken. Most stream flow measurements are incomplete, and dependence on them alone leads to more serious difficulties, than when such results are combined with all those of the mechanical or physical method first reviewed herein.

Measurements should be taken over long periods. This country is particularly lacking in such methods for its 290 navigable streams. Less than one-third of them have records extending back for more than fifteen years. Europe has been in the business since 1730, but it has comparatively few reliable records. In records here and abroad, very few accurate statements are available concerning condition of forest-cover over areas considered in stream flow measurements.

A combined record by forestry departments, and geological survey activities, would be of far more value than the single activity of stream gauging for its records alone, as far as proving the value or lack of value of forest growth on a definite watershed. Such a method was used in the case of the American Experiment in Colorado, 1909-1926. It does not seem to have been carried out fully in the Swiss Experiment of 1890-1919.

Effects of the forest vary with the geological formation, topography and size of watershed, and with the depth and character of the soil. The writer thinks soil conditions affected results in the American Experiment considerably, by securing large ground storage subsequent to removal of the forest from one of the watersheds.

It must be kept in mind that we are emphasizing the conservation or control of water, for all time periods, and that we are not discussing to any great extent the average flow or the total annual flow of streams which are affected by forest growth. Either the averages or the total might show won-

derful quantities of desirable water, but during the time applying to either, the lake, stream, river, creek or springs might be entirely dry, meaning a cessation of water for drinking and manufacturing purposes, or such a reduction in quantity as to cause serious inconvenience and even peril to individuals and property. Enough of such periods, combined with fire hazards and removal of manufacturing establishments to other locations would soon serve to impoverish the locality affected.

A significant set of facts have been developed with regard to streams emanating in the Eastern plain of the Appalachian System. Forested watersheds yield 61 per cent. of eight months flow during three months from April to June, which they gathered in the storage periods.

Cultivated areas yielded 73 per cent. and barren drainage areas yielded 89 per cent. of their total amount of eight months flow.

We recognize April, May and June as fairly good storage periods; therefore, the cultivated and barren areas are storing far less water than areas with forest cover.

It will perhaps be of special interest to those who operate well supplies, that the application of these conditions to their means of getting quantity production, is most important, although showing effects more slowly than the supplies taken from the surface. In 1911, Dr. W. J. McGee described a condition which we may expect to have repeated in the South. His investigation has to do with areas which were then extensively cleared of forest growth. During 22 years in the States of Wisconsin, Illinois, Tennessee, Ohio, Michigan, Minnesota, Kentucky, Iowa and Indiana, 9,500 wells indicate a lowering of 1.3 feet minimum in the water table, all corresponding to 13.8 feet in 80 years. He states that the lowering is due to quick run off, increasing as the time progresses. In the record are entries showing the disappearance of springs and smaller source streams. The regimen of nearly all streams has been deteriorated.

The Swiss Experiment in stream gauging has been mentioned. Some call it the most careful and conclusive evidence of the influence of forest growth upon the regularity of stream yield. Two comparatively small watersheds, one containing 140, the other 175 acres, have been made the basis of the experiment. Topography and surficial characteristics, geology, soil, and latitude were selected as near alike as it is possible to find them. However, one was covered by forest almost entirely; the other was 70 per cent. vacant. Rainfall, precipitation, run off measurements, and tem-

peratures all were carefully recorded. Responsible and trained men had the work in charge. As a result, thus far, it is found in high water periods that the deforested watershed causes the stream channel to carry 30 to 50 per cent. more water per unit of area than does the forested watershed. After periods of drought the springs of the deforested area, dry up and the stream bed is dry, while the stream bed of the wooded area still yields water. The investigator finds that the forest benefits the streams by equalizing the flow in dry and wet periods, without diminishing the total annual yield. He finds that the total amount of water discharged remains the same per unit of area of watershed.

The American Experiment at Wagon Wheel Gap, Colorado, is one of the very few of its kind in gauging the flow of streams in America. Similar to the European investigation, two watersheds were selected of small areas, and of quite similar characteristics with the exception of one particular and important feature. One watershed was shaped more as a rounded basin. The other was very much elongated as a funnel. The areas were very nearly the same, 200 and 222 acres, one being 7300 feet long, the other 4600 feet long, the one of greater length being of less width by 570 feet. Being adjacent and boundaries touching the other, the precipitation could not vary to a great extent. Height and temperature were very nearly equal. Dams and equipment were so built, that their measurements might be read automatically, and silt taken out and measured three times a year.

The difference in operation, between the American and the European method, occurs in cutting the forest after the first period of 8 years observation on one of the American watersheds. As the Swiss Experiment is understood by the writer, no cutting was done and no diversion of years in the experiment were taken into account. The Swiss Experiment recorded the wet and dry years stream flow.

However, it must be noted that during the 7 years after denuding the forest at Wagon Wheel Gap, small trees grew to the height of 4 feet. In the report this significance is not mentioned as a reason for the maintenance of storage possibilities on the denuded watershed. The writer believes that greater stream yield is also caused by the greater distances that ground water had to travel, as compared to the watershed whose forest remained intact.

Before the forest was cut, the two areas produced the following percentages as run off, 28.9 and 29.3.

After the forest was cut, the runoff produced is recorded as 0.293 and 0.349, the greater being had from the denuded area. However, these are all time averages only. One would expect much irregularity where the forest was cut.

The annual excess flow from the deforested area equaled 0.96 inch. But the silt carried by the stream increased from 5 to 15 times as much as it was before the forest was taken off. Throughout the experiment, the soil conditions were so very good that little water appeared as a surface runoff; therefore, erosion had only just begun when the experiment was brought to a close. The report states that the soil conditions on both areas afforded exceptional ground storage. No credit is given the forest for aiding in storage, and from records shown this appears partly justifiable; however, no forecast is made as to the disastrous effects of soil removal by erosion when allowed to get well under way, say for another 5 to 7 years.

By deforesting, the ratio of high stages to low stages of stream flow was increased from a proportion of 12 to 1 to that of 17 to 1. It seems to the writer that those responsible for the Report on the Wagon Wheel Gap Experiment, rather reluctantly admit that increasing ratio of flood or high water occurrences are a sure indication that every agency is needed for protecting the soil from erosion. In other words, the forest must be preserved to prevent erosion of soil, the function of which is to store up water and feed it out in seepage when most needed.

MINE FIRES CAUSED BY FOREST FIRES

By Forester Lawrence Fisher

PREVENT FOREST FIRES—IT PAYS, is a slogan of the Pennsylvania Department of Forests and Waters which is known throughout the State by all classes of people in all walks of life. Forest fires in the past have done great damage to standing timber, small seedlings and sprouts. In addition to this, untold damage has been done by forest fires to beauty spots, along and off the main highways. Areas which abounded with game have lost their value as a mecca for the hunters. Streams which were considered as a paradise for fishermen have almost disappeared. The soil has lost its covering leaves and litter, thus exposing it to soil erosion and destroying much of its fertility.

In addition to the damage which has been mentioned there is also a great damage which often

occurs in the Anthracite Coal Region, namely the setting afire of coal veins.

Anthracite coal was deposited in prehistoric times in the form of vegetable matter. This was then covered over with water and a layer of sediment was deposited, and then other layers of vegetable matter and sediment were deposited. These deposits of vegetable material and layers of sediment caused the coal to form in layers, each being separated from other layers by deposits of sediment. This region was subjected to great pressure and the deposits of vegetable material were thus formed into coal and the sediment into rock. On account of the great pressure there was an upheaval of the earth's surface at some places. Then the action of the glaciers and weather caused the veins of coal to be exposed at the earth's surface.

These exposed parts of the veins are called "outcrops." One of the ways in which an "outcrop" of a vein may become ignited from a forest fire is as follows:

As the coal is mined, part of the vein is not removed, but is allowed to remain as a support to hold up the surface. The coal that has been removed allows part of the surface over the vein to fall. This opening in the surface of the ground is called a breach. The part of the vein which remains may thus be exposed. Sometimes the action of the weather will cause this exposed coal to break off in small pieces, thus making it more easily ignited.

In the course of time leaves, dead wood and other debris of an inflammable nature collect in the breaches, causing them to be mine fire hazards. During a forest fire the material which is in a breach becomes ignited, smouldering and burning, finally igniting the exposed and loosened coal.

The fire may smoulder for weeks or even months before it is discovered. When it is found that the vein is on fire, the owners of the mine immediately take steps to stop it from burning through the entire vein. In order to extinguish a mine fire, it is necessary to segregate and flood that part of the vein which is on fire. In order to get to the fire an opening is made from the surface to the nearest gangway or heading which may have been abandoned some time previous. The work of shutting off the area which is on fire is done by filling the gangways and headings on both sides of the fire with concrete or brick, which closes off a section of the vein, which is on fire, from the gangway to the surface. This section is then flooded with water, either by pumping it into the gangway or breach, or, if a stream is available,

by building a flume from the stream to the opening of the breach.

Another way in which the vein may be ignited from a forest fire is through the air hole. This air hole is driven from the interior workings of the vein to the surface, and is used for ventilation. If it is to be used for a comparatively short period of time, the hole is timbered and planked from the interior workings to the surface. During a forest fire these timbers and planks are sometimes ignited, causing great danger to the vein of coal.

If the fire has not gained too much headway, it may be extinguished by pouring water on the sides of the air hole and tearing out the timbers. If the fire has too much headway, it is possible to block the air hole off from the interior workings and flood it with water. However, when the vein of coal is ignited it must be segregated and flooded as has been described.

The danger of a vein of coal becoming ignited is always present during a forest fire where there is an outcrop, or where an air hole is exposed to the flames. In order to extinguish such a fire, many thousands of dollars have been spent in the past, and even then some of them have not been extinguished. Not only does the cost of sealing off the segregated area amount to huge sums, but also large expenditures are necessary for the construction of the pipe lines or flumes for the transportation of the water used in flooding the segregated area. In addition to this loss, is the loss of the many thousands tons of coal through the burning of a coal vein.

A novel way of providing for the retirement of a bonded debt has been found by the Niagara Hudson Power Company, whose hydro-electric power system covers the northern and eastern sections of the State of New York. The company is planting trees. Norway spruce, red pine, and white pine were planted on the company's properties last year, amounting to 5,000,000 trees, which brings the company's total plantings up to 29,600,000 trees, sufficient to cover about 30,000 acres. John E. Keib, forester of the company, says that they are planting the trees to protect the future of the wood and paper industries, for the conservation of the water supplies for hydro-electric power, and for the prevention of floods and erosion of the soil. The president of the company says they expect to pay off a bond issue with the trees which are being planted.—*The Financial World*.

FOREST LEAVES

APRIL, 1932



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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 324 Commercial Trust Building, Philadelphia.

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EDITORIALS

HOW many members of the Pennsylvania Forestry Association are on the alert for opportunities to put into practice the tenets which we are advocating?

If we look about it is not difficult to find plots of land that are useful for no other purpose than tree planting, which will also beautify the landscape. Our President has for some time noted a tract of 25 acres belonging to the Borough of Media, adjoining Ridley Creek and extending north of State Highway Route No. 1. Ridley Creek furnishes the water supply for the borough.

On February 14th he applied to the Borough Council for permission to reforest this tract, which was readily granted. Formal application was made by the Council to the Department of Forests and Waters, through our local District Forester, Mr. E. F. Brouse, for 12,000 evergreen trees. It is planned to reforest this tract by two plantings, one in April, to be a memorial planting to George Washington; the other later to commemorate the 250th anniversary of William Penn's landing. This work is also appropriate to the slogan "Restore Penn's Woods." It is proposed to enlist the Boy Scouts, and the school children of and in the vicinity of Media for the plantings, accompanied by exercises appropriate for these occasions.

C. P. B.

In pursuance of the resolution passed at the last Annual Meeting, letters were sent to all the Sportsmen's Associations in the State, sending them a copy of the resolution, and pointing out that better prevention of forest fires will reduce the resultant losses to game and fish and their habitats. These organizations were requested to pass similar resolutions and send copies to the Department of Forests and Waters and the Game Commission, also a copy to us for publicity purposes. To date a number of copies of such resolutions have been received, and they continue to arrive, as organizations hold their meetings. It is hoped that greater concerted effort will achieve this purpose.

The resolution read:

"RESOLVED, That the Pennsylvania Forestry Association, assembled at its Annual Meeting, approves of the action of the Council of this organization in recommending to the State Legislature an increase in the Biennial Appropriation for the Department of Forests and Waters for the purpose of more adequate protection of the forests against the many recurrent fires and to make this expenditure more in line with the actual fire hazard."

The above resolution is based on our approval of Prevention being more effective than Suppression of forest fires, and for this, special equipment and trained men must be available.

C. P. B.

Last year the American Tree Association proposed that in commemoration of the Bicentennial year of the birth of George Washington 10,000,000 trees be planted in the United States. Particularly was it suggested that such trees be utilized for roadside planting and beautification.

This suggestion has received popular approval, and the idea has been furthered by many organizations of various types. We believe that everything which stimulates the interest of present and future citizens in trees is an aid to the cause of forestry. We commend to our readers that they foster and assist in this movement, and especially that they seek to obtain local planting of trees during 1932.

There is no greater need in the United States today, in the matter of self-strengthening, than that of trees. There are 120,000,000 idle acres now existing in the United States which are suitable for forests only. The crop of timber steadily dwindles, while the rate of consumption is on the increase.

C. P. B.

Our fellow member and one of our active Vice-Presidents, Mr. W. B. McCaleb, has recently been elected, for a five year term, as a Director of the American Forestry Association.

SPRING ARBOR DAY PROCLAMATION

In the Name and by Authority of the Commonwealth of Pennsylvania, Governor's Office

I GIFFORD PINCHOT, Governor of Pennsylvania, do hereby designate and proclaim Friday, April 8th, and Friday, April 22nd, as Spring Arbor and Bird Days, to be observed by the planting and conservation of trees and the study and preservation of bird life.

This year marks the two hundredth anniversary of the birth of the Father of our Country. Throughout his busy and useful life George Washington loved the out-of-doors. As frontiersman, surveyor, lumberman, and tree planter, he knew the forests and wild life and realized their value. In our appreciation of nature let us imitate Washington, who was always seeking new knowledge of trees and the living things that make their homes in forests.

On his frequent marches through the woods, which began in early youth and continued until he was President, Washington collected and sent home thousands of seeds and seedlings to be planted on his Mount Vernon estate, which is forever enshrined in the hearts of Americans.

Therefore, in commemoration of the nationwide bicentennial celebration of Washington's birth, I urge that on these Spring Arbor and Bird Days a tree be planted by every school child in this Commonwealth, and that each tree be named for the planter and dedicated to the memory of Washington.

GIVEN under my hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this twenty-second day of March, in the year of our Lord nineteen hundred and thirty-two, and of the Commonwealth the one hundred and fifty-sixth.

By the Governor,
GIFFORD PINCHOT.

RICHARD J. BEAMISH,
Secretary of the Commonwealth.

The National Forest Reservation Commission approved 547,945 acres of land for federal purchase in the fiscal year 1931. The total cost of lands approved for acquisition was \$1,943,736, or an average of about \$3.50 per acre. Lands approved by the National Forest Reservation Commission for purchase in Pennsylvania comprised 18,054 acres at a cost of \$139,360.

IS WOOD STERILE?

By Dr. L. D. Overholts, Department of Botany,
The Pennsylvania State College

I HAVE every reason to believe that ordinary wood in sound condition, in the living tree is entirely sterile. Likewise, sound dead wood is sterile. These somewhat dogmatic statements are based on the following facts, that every pathologist has demonstrated hundreds of times. In making cultures of wood destroying fungi and other wood-inhabiting types, when one gets outside the region of action of the mycelium he obtains no organisms, not even bacteria. When a sound block of wood is opened up under sanitary conditions and cultures made from it, one always fails to get growth. One might think that possibly a type of bacterium might be present that would not grow on ordinary media that are used for wood-destroying fungi. But if such a bacterium were living on the organic matter contained in the living cells of the wood, it would grow on at least most of the culture media for fungi, since they contain essentially the same kind of organic materials as does the cell sap or the water in transport. If such a bacterium were living on the cell wall it would eventually produce some effect on the structure of the wall—a disintegrating effect and likely a discoloration.

I have no doubt that ordinarily, unexposed wood is entirely sterile, especially if in living trees. Any other belief would verge too much toward the old idea of spontaneous generation.

NEW YORK REFORESTATION ACT SIGNED

THE enlarged reforestation program approved by the voters of New York State was formally started when Governor Roosevelt signed the Hewitt amendment on February 2. The Hewitt amendment provides the means for the extension of State reforestation areas. Under the plan approved \$19,000,000 will be expended over a period of years in this work. The sum of \$1,000,000 is made available for the present fiscal year, and future amounts will be available rising on a gradual scale.

With the funds available, the New York State Conservation Department will be in a position to accelerate its program of acquisition of land for State Forest reforestation purposes and managing productive forests. Senator Hewitt, in an interview immediately after the Governor signed the bill, made the following statement regarding the program:

The functions of the forests to be established are:

- (1) Protection of our watersheds.
- (2) Creation of public hunting and fishing grounds.
- (3) Providing areas of forest and woodland adjacent to communities in all parts of the State where camping and picnicking may be enjoyed on publicly-owned land.
- (4) The production of timber which will help to maintain the existing wood-using industries and bring back some of those industries which have left the State for lack of raw materials.

Last, but by no means least, by reclothing with trees our abandoned farm lands, thus improving vastly the appearance of our State.

COMPARATIVE FOREST FIRE DATA FOR AVERAGE OF 10 YEAR PERIOD 1916-1925

State	Forest Area in acres in 1927	Average No. of fires	% of forest area burned	Total damage	Budget Allotment per acre
Maine	15,000,000	155	0.16	\$152,800	1.6c.
New York	12,100,000	555	0.13	\$29,700	2.6c.
Pennsylvania ..	13,000,000	2,143	1.18	\$497,600	1.6c.

(Taken from Technical Bulletin 166, issued March, 1930, by U. S. Department of Agriculture.)

In the fiscal year ending December 1, 1930, Oregon, with 11,300,000 acres, spent over 5c. per acre for fire prevention and suppression.

In Pennsylvania, for the 4 years ending June 30, 1930, there occurred an average of 2,289 forest fires annually, and the total expenses of these fires, including suppression costs, were 2.9c. per acre. This was more than the allowance made by the Legislature, and required subsequent deficiency appropriations.

Because of the greater number of railroads, roads, etc., making a greater fire hazard and larger fire loss, as shown by the comparative figures above, we believe that for a few years the appropriation should be double the above, or 6c. per acre.

In an address before the Pennsylvania Game and Fish Protective Association in Philadelphia on December 8, 1931, Mr. George H. Wirt, Chief Forest Fire Warden, said: "Prevention of forest fires is possible, but a great deal of money is necessary. Still, I believe a time will come when we can show the people that forests can be made practically fireproof."

MANY OAK TREES DYING THROUGHOUT PENNSYLVANIA

THE Department of Forests and Waters has been receiving inquiries about many oak trees that are dying throughout Pennsylvania. Entomologist Josef N. Knull, of the Research Institute, visited certain parts of Clarion, Venango, and Forest Counties to observe the dying oaks in that section of the State, and the same conditions that exist in these counties might also be applied to other sections of the State. Mr. Knull's report follows:

"Oaks of the black oak group including red oak, scarlet oak and black oak are dying by the hundreds. The trouble is worse in woodlots and open woods. The light brown tops of the dead trees stand out against the green foliage of the surrounding stand and have prompted many inquiries by residents of that section.

"A careful examination of the dead trees indicated that death is due to a combination of troubles.

"(a) Lepidopterous (worm) defoliators had been plentiful through certain parts of the Allegheny Plateau several years past. These insects tend to lower the vitality of the trees attacked.

"(b) In the spring of 1930, large areas of the Allegheny Plateau were visited by a late frost which killed all of the young foliage and made large forest areas look as if they had been visited by fire. Frosts of this type act considerably in lowering the vitality of trees.

"(c) The 1930-31 drought which followed both (a and b) so lowered the vitality of many of the trees that they became an easy prey for the two-lined chestnut borer (*agrilus bilineatus* Web.) The ring growth on many of the dying dominant trees shows a retardation for approximately the last five years. The fact that no white oaks are dying indicates that the black oak group is more susceptible to adverse conditions.

"(d) Observations show that practically all of the dead and dying trees are infested with the two-lined chestnut borer.

"It is my opinion that the vitality of the trees was lowered by (a, b and c) to such an extent that it would produce death in some cases. However, many of the trees affected by (a, b and c) would undoubtedly survive if the two-lined chestnut borer would not attack them.

"The larvae of this insect work beneath the bark and cut off the food supply of the infested trees in much the same way as bark beetles do.

"Control methods in large wooded areas are impractical from a commercial standpoint. Valuable trees on estates can be stimulated with fertilizers together with liberal applications of water. This treatment should be given in the spring and not in the fall. The two-lined chestnut borer does not attack healthy fast-growing trees.

"Another way of protecting valuable trees is by applying the following spray to the foliage about the first of June. The adults are leaf feeders and are easily killed by poisonous sprays.

Powdered arsenate of lead..... 2 pounds
Fish oil (best grade of light pressed)..... 6 ounces
Water 50 gallons

"This spray can be used without the fish oil, which is added to increase the sticking properties of the arsenate of lead. It makes the spray more effective in view of the fact that it is not easily washed off by rain. When fish oil is used livestock should not be allowed to feed under sprayed trees."

A report from the U. S. Forest Service shows that Michigan leads in the acreage reforested in 1930, with 38,302 acres. New York is second with 24,250 acres, and Pennsylvania third with 18,048. Plantings by industrial organizations included 3,943 acres by paper and pulp mills; 11,373 by lumber companies; 3,525 by mining companies; 934 by railroad companies; 8,307 by water power companies; and 2,148 by other companies; a total of 30,230 acres reforested by industries. Nearly 140,000 acres of forests were planted in the United States in 1930, a gain of 24 per cent over 1929.

Fifteen municipalities within Pennsylvania secure their water supplies from forest areas where the State Forests are located, and more than 50 per cent of their watershed area is located on State Forest land. Four of the municipalities—Chambersburg, Shippensburg, South Renovo, and Waynesboro—have their impounding basins on State Forest land. The reservoir which supplies the town of Clearfield is adjacent to the Moshannon State Forest and is fed entirely by water rising on the State Forest land. Forty per cent of the watersheds of fifteen additional municipalities are within the State Forests. The drainage basins of these 30 towns cover one-tenth of the total forest area now owned by the State. More than a quarter million people of the Commonwealth, as well as many industries, depend upon State-owned forest land as a source of water supply.

STREET TREES FOR PENNSYLVANIA

By H. Gleason Mattoon

WHAT are the qualities of a good street tree? What species meet these requirements? These two questions confront an ever increasing number of shade tree and park commissions. While many bulletins and pamphlets have been issued to serve as guides in planting, choice and care of street trees, yet for the most part too little space has been devoted to a discussion of choice.

In general a tree suitable for roadside and street planting should meet the following requirements:

1. Long life.
2. Tolerant of adverse conditions.
3. Freedom from serious injury by insects and diseases.
4. Comparatively rapid growth.
5. Easily transplanted.

Let us understand at the outset that no species fulfills these requirements. We should, therefore, consider the various kinds in the light of these specifications to see which measures up most fully to the desired qualities.

The table below, arranged for this purpose, was designed for Pennsylvania, although it is also suitable for the adjacent territory. Variations in altitude as well as latitude will affect these figures, however they will basidly hold for all of this State.

Since many species have two or more common names, for accuracy, the botanical name is given with the best known common name below it. All data in the chart is based upon the more or less adverse conditions under which street trees grow in urban and suburban communities. The indices were arrived at after inspection of many trees growing under these conditions and should be used only for purposes of comparison. Many individual trees may be found which apparently refute these figures, but they are only "the exceptions which prove the rule."

Under severe conditions near factories the average age and height should be discounted 10 to 50 per cent. In a few instances exotic trees have not been grown in this country under these conditions very long. In such cases the ultimate age is assumed from the present condition and the normal age, with a question mark following it.

The figures in the Insect and Disease columns (see Table, Common Street Trees) do not indicate the number of pests and diseases which attack the tree, but rather the relative sus-

COMMON STREET TREES

TREE	Average Age Years	Average Height Feet	Rate of Growth	Insects	Diseases	Resistance	Head	Trans-planting	Soil
Ulmus americana									
American Elm	75	60	F	4	3	2	B	1	T
Ulmus campestris									
English Elm	75	65	F	4	3	2	SB	1	T
Acer saccharinum									
Silver Maple	45	70	F	4	6	2	SB	2	T
Acer saccharum									
Sugar Maple	50	50	M	3	4	4	SB	3	T
Acer platanoides									
Norway Maple	75	60	F	1	3	1	B	2	T
Acer pseudoplatanus									
Sycamore Maple	40	50	M	3	4	2	SB	3	RT
Acer rubum									
Red Maple	50	50	M	2	2	2	SB	3	WT
Tilia americana									
American Linden	65	60	F	3	4	2	SB	3	WT
Tilia vulgaris									
Linden	55	60	M	3	4	2	SB	3	WT
Aesculus hippocastanum									
Horse-chestnut	40	50	F	3	5	3	N	3	T
Liriodendron tulipifera									
Tulip Tree	90	85	S	1	2	3	B	5	WSL
Quercus palustris									
Pin Oak	90	60	M	2	3	3	SB	3	T
Quercus rubra									
Red Oak	100	65	M	3	3	3	B	4	WSL
Platanus acerifolia									
Sycamore	100	75	F	1	2	1	B	2	T
Ginkgo biloba									
Ginkgo	100?	65	M	1	1	3	B	3	RL
Fraxinus americana									
White Ash	40	60	S	4	3	4	SB	5	RL

In *Growth* column F stands for fast, M for medium, and S for slow.

In the column entitled *Head*, B, indicates a broad spreading tree; SB, medium spreading, and N an upright growing tree.

The relative ease with which trees may be moved is indicated in the column headed *Transplanting* by figures, 1 means that a tree will transplant without harm, while 5 denotes trees which are very difficult to move.

In the last column T means that a tree will grow in any soil; L stands for loam; S, sandy; W, moist, and R, rich.

In the column headed *Resistance*, I have attempted to indicate the relative resistance of trees to adverse atmospheric conditions, such as smoke, soot, etc. 1 means most resistance; 4, least resistant.

ceptibility of the tree to serious injury by them. As an instance the Black Locust, *Robinia pseudo-acacia*, has only one serious insect enemy, the locust borer. But this is so prevalent, does such great damage and is so difficult to control that the tree is soon killed or disfigured. In such a case the figure 6 which indicates greatest susceptibility would be placed in the Insect column. This tree, however, is not placed in the chart. The figure 1 is placed in both the Insect and Disease columns of those trees which are comparatively free from injury. Those most seriously injured have a 6 in

the proper column. The intermediate figures are for gradations of injury.

The height in feet, given in the second column, has little relation to the normal ultimate height to which the tree might attain under normal conditions. As an example *Tilia americana*, the American linden or Basswood averages 90 feet under normal conditions and occasionally reaches 120 feet, but it seldom becomes more than 60 feet tall when planted as a street tree. For an explanation of the other letters and figures in the chart see the key below.

All of the species in the above list are well known and are recognized as suitable for street planting in Pennsylvania. Specimens of each may be found in a great many communities. Yet an analysis will show decided weakness in some of them. For instance, the Silver Maple is comparatively short lived. The White Ash also, averages not more than 40 years as a street tree, due to the depredations of insects and diseases. With the increasing prevalence of the leopard moth, the grub of which does great damage, and the spread of the Japanese beetle, the age limit for elms, lindens, maples and the horse-chestnut will be reduced.

It must be borne in mind that in planting for rapid growth, sturdiness and long life are usually sacrificed. An exception is the sycamore. Incidentally there has been much confusion with regard to this tree. The species commonly called sycamore or oriental plane, which is freely planted in many cities, is in reality the London plane, *Platanus acerifolia*. The true oriental plane, *Platanus orientalis*, is seldom found in this country.

The Ginkgo is laboring under a handicap. It has been so well advertised as a species which will grow well under the most trying conditions that it has been greatly abused. This tree likes a rich loam and will make little growth for several years if the atmosphere is laden with soot or injurious gases. It is an interesting tree, being one of the few survivors of the ice age. Fossil remains have been found in North America and Europe, although 200 years ago it was known only in China. Morphologically it is related to the conifers and the ferns. Its leaf, unlike those of all other broad leafed trees, has no midrib. All of the veins radiate from the petiole. It has scarcely an insect enemy and is seldom injuriously attacked by fungous troubles.

Further discussion of the commonly planted street trees is scarcely worth while. There are, however, many other kinds which are as well if not better adapted for this purpose; trees which in most cases are a little more difficult to transplant but in resistance to insect and disease attack are superior to those already given. If in all other qualifications a tree measures up to the requirements it is certainly worth the extra care in planting.

The first one, *Ulmus pumila*, Linn., commonly called Chinese or Siberian Elm, should not be confused with *Ulmus parvifolia*, Jacq., also named Chinese elm. The former grows very rapidly after becoming established while the latter is of slow

growth. *Ulmus pumila* is included in this list solely because of its rapid growth. In other respects it is inferior to the other elms. Its length of life under such conditions is yet to be determined. It is known, however, that in 25 years it becomes a broad tree of few branches and little foliage, in China.

The white linden should be planted in preference to either the American or European linden because of its greater ability to withstand drought and heat. The blossoms of this species are believed to be poisonous to bees.

The honey locust is a beautiful tree to be recommended in every respect except that it is difficult to transplant. However if it has been root pruned yearly in the nursery row and is moved just before growth starts in the spring no difficulty should be experienced. With many trees that have a tap root such as this one, it will be found more practical to plant a younger specimen. Usually a 6 foot tree will become established so much quicker that in 4 to 6 years it is larger than one which was 12 feet tall when planted.

Some may object to the thorns of the honey locust. In such a case *Gleditsia triacanthos inermis elegantissima*, a thornless variety, may be substituted.

The hackberry which is closely related to the elms, has nearly all of the attributes with few of the disadvantages of the elms. Both the elm leaf beetle and soft scale seldom attack it. Why it is not more generally planted is a mystery, unless the witches broom effect caused by the feeding of gall aphids is objectionable.

The sweet gum is without doubt one of the most beautiful trees native to the eastern coast. The star shaped leaf is most attractive at any season, but it is incomparable with its vivid red and delicate lavenders and purples in the autumn. Only one fault prevents more general planting and that is the difficulty in planting. Like all tap-rooted trees, it must be frequently root pruned. The moving should be done only just before the leaf buds start in the spring. It is worth the effort and if planted when small will grow very rapidly.

The tupelo or sour gum is known particularly for the earliness of its fall coloring in which brilliant reds predominate. Like the sweet gum it has a tap root hence care must be used in moving it. It thrives in moist soil.

The sassafras, likewise, has a tap root. Trees no taller than six feet should be planted. Its picturesque manner of growth, variable leaves and fall coloring recommend it.

TREES SUITABLE FOR STREET PLANTING

TREE	Average Age, Years	Average Height, Feet	Rate of Growth	Insects	Diseases	Resistance	Head	Trans-planting	Soil
<i>Ulmus pumila</i> , Linn	?	30	F	4	3	3	SB	1	WT
Chinese Elm	?	30	F	4	3	3	SB	1	WT
<i>Tilia tomentosa</i> , Moench									
White Linden	80	70	M	3	3	2	P	2	T
<i>Gleditsia triacanthos</i> , Linn									
Honey Locust	100	65	M	1	2	2	SB	4	T
<i>Celtis occidentalis</i> , Linn									
Hackberry	80	60	M	2	1	2	B	2	T
<i>Liquidambar styraciflua</i> , Linn									
Sweet Gum	75	55	M	1	2	2	SB	4	WT
<i>Nyssa sylvatica</i> , March									
Tupelo	60	60	M	1	1	3	N	5	W
<i>Sassafras variifolium</i> , Kuntze									
Sassafras	75	30	M	2	1	2	N	5	SL
<i>Sophora japonica</i> , Linn									
Pagoda Tree	50?	45	M	1	1	2	SB	3	T
<i>Phellodendron amurense</i> , Rupr									
Cork Tree	60?	30	M	1	1	2	SB	3	T
<i>Magnolia acuminata</i> , Linn									
Cucumber Magnolia	70	60	M	1	2	3	B	3	WT
<i>Larix leptolepis</i> , Murr									
Japanese Larch	90	50	M	3	2	2	P	4	WT
<i>Ailanthus altissima</i> , Swingle									
Tree of Heaven	30	40	F	1	2	1	N	1	T
<i>Paulownia tomentosa</i> , Steud									
Paulownia	40	30	F	1	1	1	B	2	T
<i>Cornus florida</i> , L.									
Dogwood	75	15	S	3	1	3	N	3	RT
<i>Oxydendron arboreum</i> , DC									
Sorrel Tree	?	25	M	1	1	3	N	2	RT
<i>Koeleruteria paniculate</i> , Lækm									
Varnish Tree	50	25	M	1	2	2	N	2	T

In *Rate of Growth* column F, fast; M, medium; S, slow

In *Head*, B, broad spreading tree; SB, medium spreading; N, narrow head, and P, pyramidal.

In *Soil* column, T indicates that the tree will grow in almost any soil; L, loam; R, rich; S, sandy; W, moist.

In the column headed *Transplanting* those easiest to move are indicated by a 1; those most difficult by 5 with graduations between.

Trees which can withstand much smoke, soot, etc., are indicated by 1 in the *Resistance* column. Those least able to withstand such impure air, by 3.

The pagoda tree should be used much more than it is. Its feathery foliage, panicles of white flowers in July and freedom from insects and disease should be sufficient to establish a place for it. It normally lives to be 100 years old or more so its longevity as a street tree should compare favorably with others. In addition it is not hard to move.

The Amur cork tree is comparatively new but by all means it should be tried. It resists heat and drought well; is tolerant of poor soil; and attracts birds because of its blackberry like fruit which hangs onto the tree.

Many know the cucumber tree, yet few plant it. The reason is not clear for it has many virtues

and no serious vices. Like other magnolias both its foliage and bloom are attractive.

While the Japanese larch is the only one included in the list, several others might also be considered. This one was chosen because it is possibly the most beautiful of all with its longer needles and pendulous branchlets. Except for a poison spray in late June for the Japanese beetle and saw fly, it requires little extra attention. Like all conifers it is relatively free from wood rotting diseases.

The Ailanthus or tree of heaven and the Paulownia are added because they will thrive under the most adverse conditions. They are ideal trees for the poor dry soil and soot and gas laden atmo-

sphere in which other trees would soon give up the ghost. They will provide greenery and shade in the most congested districts where it is often most sincerely appreciated.

Like the weather so also the butchery of street trees by line clearing gangs is continually discussed but little is done about it. Many suggestions have been put forth and in some cases competent supervision is given to see that the trees are not too badly mutilated. Nevertheless, so long as trees and wires are so placed that both are supposed to occupy the same place, naturally one must give way and the tree usually suffers. Of course, the wires should be put at the rear of the property rather than on the street, and there is no reason why that cannot be done on most of the new developments, but that does not settle the problem of those on poles placed between the street and sidewalk.

There are trees which, because of their manner of growth are most suitable for planting under wires.

The dogwood as a street tree seldom attains a height of over 15 feet, so it will not interfere with wires. Moreover, its narrow head seldom grows far enough over the road to bother traffic. It is not difficult to transplant if the trunk is wrapped with burlap during the first year after it is put in. This prevents the bark from drying out and is a protection against borers.

The Oxydendron or sorrel tree likewise is ideally adapted for planting under wires. Its lily-of-the-valley like bloom in July and the magnificent fall coloring also commend it to your consideration.

The Chinese varnish tree grows not more than 25 feet tall as a street tree, so it, too, should be considered. The yellow bloom, which is very conspicuous, appears in July.

There are many others which might be used. The thought, however, which this article wishes to convey is that greater variation and more beautiful avenues may be attained by deviating from the few generally planted trees. Even though a change in the method of planting (or at least greater care) may be necessary it seems worth while. The plane tree, maple and elm, have their place, and it is a large one, but if we can obtain beautiful bloom, richer fall coloring, more graceful foliage or hardier trees, we should strive for them.

Over two billion board feet of sawed lumber are needed in Pennsylvania annually. This is 230 board feet for each and every citizen, and the annual wood growth of approximately 5,000,000 acres of forest land.

ANCIENT ELM

THE elm tree shown in the cut of this issue is standing beside the home of Miss Mary Blakiston, a member of the Council of Pennsylvania Forestry Association. Miss Blakiston and her sister, Emma, live on the Cherry Lane Farm in Upper Dublin Township, Montgomery County, near Fort Washington. The homestead was built about 1780. As nearly as can be determined from local residents, this tree was planted probably a few more than 100 years ago. It is a magnificent specimen having a spread of from 90 to 100 feet, and a circumference at one foot above ground of 12 feet 4 inches. At 4½ feet above ground the circumference is 11 feet 2 inches.

The photograph was taken February 12, 1932, by George H. Wirt, for the Department of Forests and Waters.

HURRAH! FOR THE RED, WHITE AND BLUE!

TO honor the two hundredth anniversary of the birth of George Washington in 1932, ten million trees, each one indicative of a Nation's testimonial to the Father of Our Country, are being planted throughout the United States.

In cooperation with the George Washington Bicentennial Commission directing this gigantic task, many Pennsylvania foresters have planted trees in some manner that will fittingly remember the affection that America feels for Washington.

A George Washington Bicentennial Plantation, which is unique as a memorial to our National Hero, was established recently in the appropriately named town of Liberty. High School students at Liberty, Tioga County, Pennsylvania, under the direction of District Forester Paul H. Mulford and Forest Inspector C. F. Lamberson, set out the plantation of trees on land owned by the borough. The species used were *red* pine, *white* pine, and *blue* spruce.

The people of Pennsylvania are consuming forest products at the rate of ten times their own weight, or one and a half tons for each man, woman and child in the Commonwealth. The total yearly timber consumption is approximately one billion cubic feet of wood.



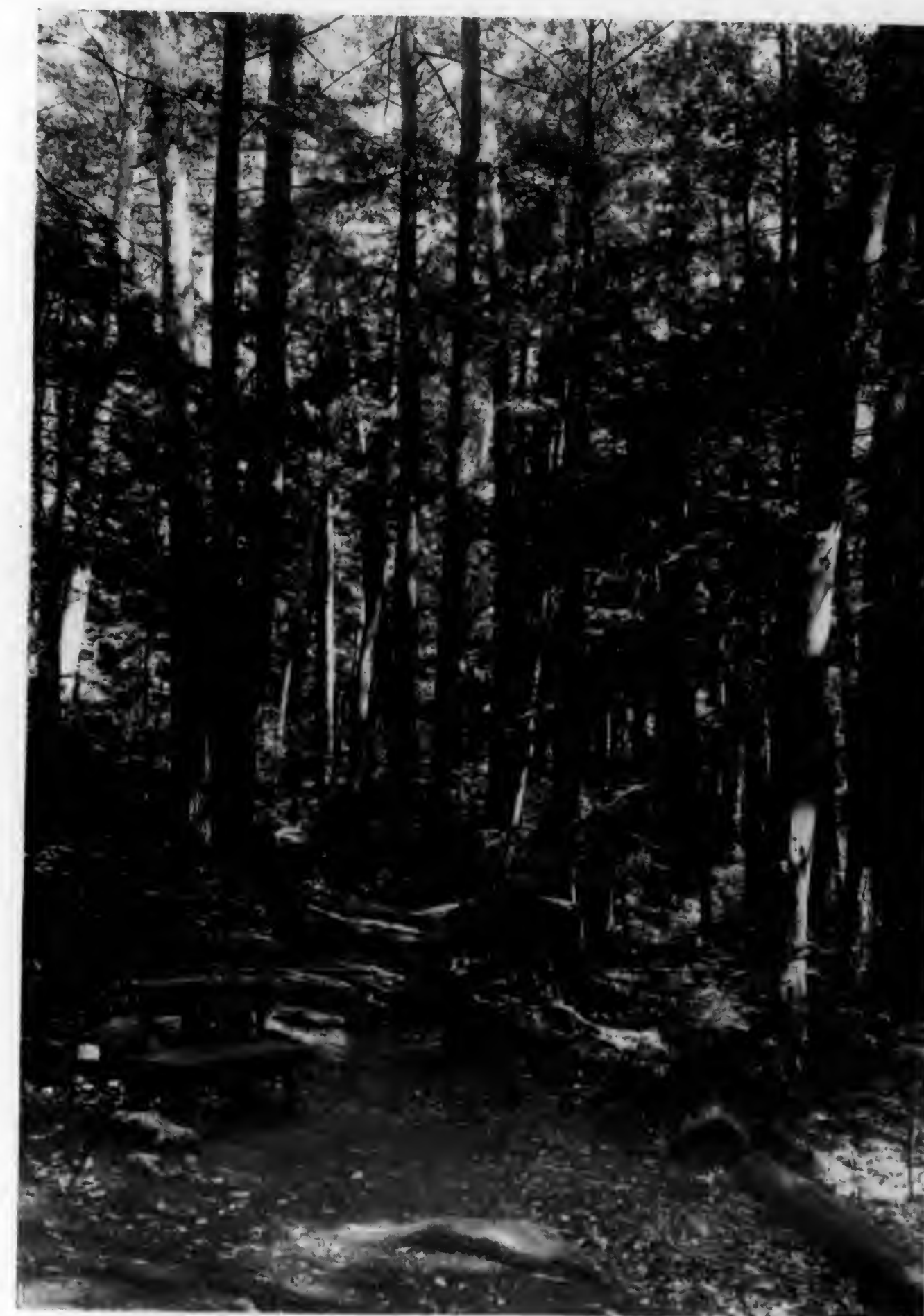
THE HEMLOCK—THE PENNSYLVANIA STATE TREE



OLD ELM TREE ON CHERRY LANE FARM, NEAR FORT WASHINGTON, MONTGOMERY COUNTY, PA.



TOM'S CREEK, COOK STATE FOREST PARK



LONGFELLOW TRAIL, COOK STATE FOREST PARK



THE HEMLOCK—THE PENNSYLVANIA STATE TREE



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TOM'S CREEK, COOK STATE FOREST PARK



LONGFELLOW TRAIL, COOK STATE FOREST PARK

Photos Courtesy Department of Forests and Waters.

**"BY-PRODUCTS PROSPECTS IN RELATION
TO FOREST MANAGEMENT"**

PROF. W. L. BEUSCHLEIN, Department Chemical Engineering, University of Washington, in an outline of possible chemical wood uses to meet forest utilization and production problems, and hence protection problems, said:

Forests produce a complex grouping of little-known materials. Cellulose, lignin, hemicelluloses, tannin, resins, etc., sound familiar, but of their properties not an over-abundance is known. Woods contain from 55-60 per cent. cellulose. This is insoluble in water and not hydrolyzed by dilute acids. Closely allied are the hemi-celluloses which are soluble in dilute alkali and convertible into simple sugars by heating with dilute acids.

Lignin is the non-carbohydrate portion of lignified substances. It probably varies greatly in composition from wood to wood and even in a given tree. It may occur as 15 to 30 per cent. of the weight of wood. Its great complexity will permit this substance to find widely diversified uses in the future.

Other constituents of wood are tannins, resins and oils. Bark and woody parts may contain from 1-20 per cent. tannin while resins and oily fractions are to be found as only minor portions.

Commercial chemical utilization of our forests has been built around cellulose, hemi-celluloses, lignin, tannin, resins and the oils. Treatment of wood chips for paper pulp now represents a large industry of great importance to the Pacific Coast. Chemical utilization of wood cellulose has been introduced industrially within the last decade and will further enhance the pulping industry of the West.

After the Great War, the United States had on hand great stores of nitro-cellulose, which had replaced nitrated gun cotton. Chemists found that this propellant could be diluted with sodium nitrate and sensitized with nitro-glycerin to yield a blasting powder. It is possible to now make blasting powder from wood cellulose.

The lacquer field constitutes one-third of the business of the Hercules Company. Duco and rayon are made from cellulose. Lacquers are solutions of cellulose nitrate, acetate or viscose in organic solvents. While cotton linters are also used, some rayon plants use entirely wood cellulose. For paper, length and strength of fiber are important while percentage of cellulose is less so. For rayon, chemical properties are essential, but

physical properties bear little upon the process. Certain Northwest woods yield poor paper pulps. In the near future these same pulps as cellulose will be used for other processes, as in lacquers and rayons.

Synthesis of sugar and alcohol from wood is now being carried on commercially. Wood chips are treated with concentrated hydrochloric acid resulting in conversion of 60 per cent. of the cellulose into water soluble carbohydrate which is called wood sugar. The acid is expelled or evaporated with hot gas-oil and the oil separated by decantation from the sugar solution. As a hog and cattle food, this material is winning great favor. The insoluble woody material makes a good fuel.

By hydrolyzing chips under a high temperature with dilute acid, sugars can be made which upon fermentation yield alcohol. The process is very cheap, four pounds of wood being equivalent to one pound of alcohol. Sugars may be added to the woody residue and stock feed produced.

Nature's warehouse of lignin has as yet been unopened. Huge quantities of this material are disposed of in our rivers and bays as waste. When we consider that 50 per cent. of the weight of the dry timber going into a pulp digester is lost as waste, demands for oxidation of this waste become enormous. Such wastes will soon create demands for lignin utilization.

A mill in Wisconsin is now separating lignin from waste sulfite liquor. After filtration, the liquor can be evaporated to dryness which leaves a black tarry mass. The ligenous tar no doubt contains many valuable components—it is burned at present. Wood tar is an excellent fuel binder and when made available will no doubt find a use in the briquetting of coals.

Mucic acid has been made from larch. Hot water extraction of the larch removes galactan and oxidation of this latter with nitric acid yields mucic acid. The complete process is extremely simple. Mucic acid finds a use in baking powders, replacing tartrates and alums.

Western hemlock, fir and spruce barks contain from 5 to 18 per cent. tannin, hemlock averaging 14 per cent. Due to only Eastern markets, plants on the Coast must meet competition by shipping solid extract. A 30 per cent. solution is sprayed into a hot air blast, the gases passing into a dust separator wherein the powdered tannin is collected. Tannin manufacture should have a most optimistic future.

A highly profitable naval stores industry has

been developed in the South. We find portable stump splitters and pullers clearing stump land. The material is hogged, steam distilled for turpentine, and then extracted with gasoline for resin. Is it a long way between splitting a long leaf pine stump and a Douglas fir stump? Anyway, much fir can be selected in our logging camps and mills which compares favorably with long-leaf pine.

Leaves or small twigs of coniferous trees such as cedar, hemlock, spruce, fir and pine contain volatile oils that can readily be obtained by steam distillation. The yield varies from 0.2 to 0.5 per cent. depending upon the species and the season of the year when the leaves were cut. In New England, this industry is carried on by farmers who use portable stills. Oil of Eucalyptus and cedar oil have been produced on the Pacific Coast. Cedar oil has been incorporated into a plastic, molded into small balls and sold as a moth preventative, under the name of "Mothene."

Pyroligneous liquor, a product of wood distillation, contains acetic acid, methanol, acetone, esters and water. Attention has been given to separating acetic acid from the original pyroligneous acid. In a plant in Tennessee, high boiling wood oil is used to absorb acetic acid vapors from the gaseous pyroligneous liquor. The process is cheap and easy to operate. Vapors are condensed, forming a high strength acid. This acid is dehydrated forming acetic anhydride and this product reacts with cellulose to form a soluble cellulose acetate. Cellulose acetate has found a ready market in the preparation of our moving picture films and in "Cellonese Silk."

Wood tars from carbonization plants are finding varied uses in the rubber industry. The high absorptive values of charcoals make them valuable for deodorizing and decolorizing although their friability is an important drawback. The intense search of the rubber industry for special carbons suggests a possible use for soft wood charcoal.

Balsam wool and Masonite are indications of mechanical alterations of natural wood. These products are made by literally blowing wood to pieces through the expansion of superheated water within the cells. Before pressing these blown fibers back into grainless boards, colors, fire retardants, and reinforcements may be added. The finished product represents saving in wood and a new field of service.

One must be impressed by the dearth of chemical utilization of our western woods. There is but one method to extend the forest products industry beyond its present output of lumber and pulp;

namely, the organized and directed labor of experienced research men.

LUXURY FORESTS

By Assistant Forester J. W. Tyler, Valley Forge Forest District

IN the Valley Forge District comprising as it does the seven counties adjoining the metropolitan areas of Philadelphia, Allentown, Bethlehem, and Reading, there is a phase of forestry which is becoming more and more prominent. That is the problem of handling the woodlands on the estates. There is a constant increase in the number of estates though the estate woodlands make up only a comparatively small portion of the total forest area in the District. More and more, the estate owner is turning to his woodlands as a source of pleasure and enjoyment. My observations while engaged in a timber survey of the section indicate that entirely different recommendations must be made for this type of woodland than are made for a timber forest. The owner is little interested in growing timber. He wants to improve his timberland so that it will always be a source of beauty and pleasure to him. It must be made easily accessible through paths and roadways, yet must retain a "wild" appearance. In other words, he wants a "Luxury Forest."

A public forest policy, to be successful, must have the support of the estate owner, as well as everyone else, and we can better secure his support if we interest ourselves in helping to solve the problems in relation to his own private forest. If we expect cooperation with our plans we must in turn give cooperation. It cannot be gotten by a one-sidedness on our part.

Luxury Forests have been described as the "Private estates of the wealthy, parks and game preserves." They are the forests which are managed primarily for the greatest amount of enjoyment.

With the foregoing remarks in mind I would like to bring out certain things which have come to my attention in regard to the Luxury Forest on the estate. What goes into the make-up of a Luxury Forest? It has the larger trees, the monarchs of the forest. Smaller trees and shrubs are found individually, or in groups, over the entire area. Wild flowers greet the eye on every hand. Ferns and other water-loving plants dominate the moister places. Throughout the spring and summer seasons one bloom follows another, climaxed by the gorgeous contrasts of leaf coloration in the fall.

Even winter in our forest has a beauty of its own. The evergreens are revealed more at this season than during any other. Views to distant vistas have been opened up. Everything leads to the enhancement of the beautiful, but all formality has been avoided. "Naturalness" is the keynote.

In every old forest or woodland there could be located certain small areas that would measure up, more or less, as Luxury Forests, but in most instances such forests must be planned and executed by man. In planning a Luxury Forest many factors must be considered. The contour of the ground would influence any plan to be made. A steep hillside would have to be treated differently than flat ground. The species present on the ground would influence the choice for thinning out or leaving the trees. The underbrush must be removed or left, as it would fit into the plan. Streams should be considered carefully. Roads and trails would have to be built, and should be so located that they will occasionally reveal a distant horizon or a view of a large stately tree to the passerby. Every tree must be considered an individual as well as a member of a group. The area of the tract would influence the intensity of the treatment. Many other factors would enter in and all must be correlated so that they will give the best results. Joyce Kilmer wrote that "Only God can make a tree," but man can place them so they are set off to best advantage. This is the prime endeavor in building a Luxury Forest. Everything must be done to accentuate every natural feature. A boulder can be made an object of beauty by giving it the proper treatment. Even a few old, decayed logs are desirable.

The first step in converting the average woodland into a Luxury Forest would be to secure a map of the area upon which could be laid out the various natural and growth features, such as big trees, rock areas, and natural meadows. These would be determined by a careful intensive survey of the area as a whole. All existing roads or trails should be mapped. Any outstanding trees should be noted for future treatment. The species should be listed with an idea as to the amount and location of each. An intimate knowledge must be secured and as much of this knowledge placed on the map as is possible. Even the species of wild flowers and ferns, with their distribution, should be determined. This information is essential before any actual work is done, for it is desirable to make use of every bit of natural growth before going to the expense of introducing plant material.

After this work has been completed and a plan

has been formulated we would be ready to begin the actual work. The first work would be a form of improvement cutting in which all undesirable material would be removed. No definite rule could be laid down as to what to remove as this would be too variable. Beauty alone, and not the value of the trees as timber would govern the decisions. Vines, which in the timber forest would be undesirable, would often prove picturesque in the Luxury Forest, if they were not allowed to spread too far. Dead and dying trees would naturally be removed, though occasionally it would be advantageous to have a tree specialist try to save some particularly outstanding specimen. The loss of one tree could spoil a particularly fine group. All obnoxious underbrush should be removed, but laurel, rhododendron, huckleberries, or ground pine should be saved and favored. Wild azaleas are also worth careful attention. All natural plant associations should be considered carefully before anything is removed. If any pruning is necessary it should be done at this time and care should be taken in such work so that prompt healing of the wound will be possible.

Along with the cutting, a road and trail system should be put in. Grades should be kept as gentle as possible. Turns should always be long, unless a short turn is unavoidable. Roads and trails should be located so that the outstanding natural features are easily and attractively reached. A winding road or trail is the best as it enables you to bring in the unexpected views which are a surprise and a delight for the beholder. If there were roads and trails already present on the area these should be adapted to conform with the plans. Bridges should be rustic in nature to secure the desired "atmosphere." Rustic benches should be built and placed occasionally along the trails, trying to locate them where the surroundings are particularly beautiful. Rustic pergolas might be advantageously placed if the area is large enough to warrant them. Streams and springs should be cared for. A small stream can be greatly beautified if stones are so placed across it that low dams are formed. These dams will form small pools of water which are very attractive. Springs should be walled up, though a dry built wall would be better than formal masonry walls.

Following the cutting and engineering features we could further enhance the value and beauty of our forest by planting trees, shrubs, and wild flowers of species not already present. It is of extreme importance that we know and remember the requirements of the various materials we want

to plant. Here a knowledge of plant associations would prove invaluable. If the original woods has little or no evergreen growth in it some should be added. Hemlocks are extremely desirable. Pines, spruces and cedars are also desirable and will aid the appearance of the forest. Of the smaller trees which should be left or introduced are the dogwoods, viburnums, hereules' club, red bud, witch hazel, mountain ash, striped maple, alders, sassafras, sumachs, hawthorns, and even flowering cherries where the climate is not too severe. These species are merely suggestions. Many others could be found. Selection of species should be made according to quality and time of bloom, leaf coloration, or form of plant. This applies to all plant material. All plant material should be so arranged that when one species stops blooming another is ready to take its place, thus prolonging the blooming period. The fruits and autumn coloration of some of the shrubs make them very desirable. Following are a few of the shrubs which would fit in nicely: forsythia, euonymus, bitter-sweet, azalea, rhododendrons, laurel, pachysandra, and winterberry. Of the wild flowers that could be used to advantage are golden rod, asters, violets, hepatica, bloodroot, arbutus, trillium, columbine, mandrake, pipsissewa, rattlesnake, plantain, joe pye weed and many others. The principle to follow in all the planting work is to secure contrasts of color or form. Oftentimes, too, a group planting can be used to hide a view except from the angle from which it appears at its best. It is through this type of screen planting that the unexpected view is possible. The wild flowers can be used admirably in some of the more open spaces. Care should always be taken to see that the flower is planted in its own habitat. Along the streams the ferns can be worked in very nicely. Mosses and lichens are very desirable and should be favored where possible. The various forms of claudia are extremely pretty on the forest floor. Flowering shrubs look well if planted along the roads and trails. Formality of arrangement must be carefully guarded against if any "wild" appearance is to be retained.

All the above suggestions must be adapted to the local conditions. Due to the fact that an attempt is being made to secure "naturalness" no rules can be laid down. It is appearance and common sense, gained through a knowledge of the growth conditions of the plant materials used, that will govern the whole procedure.

So far the subject of protection has not been considered. Fire is the worst enemy of such a

forest and in case the land should adjoin another woodland adequate fire lanes should be constructed to protect the area from any possible fires which may spread from the other woods. The roads and trails will serve as fire lines inside the tract though additional ones should be constructed if needed. Every precaution should be taken in order to insure the safety of the area from fire.

Protection from insect and fungus troubles is another important consideration. The Luxury Forest represents an investment which would suffer partial or complete loss from the depredations of insect or fungal enemies. The value of the trees and other plants lies in their being healthy so that they may have the best form and growth. Any agency which works against the health of the trees or plants lessens their value. There are estate owners today who are having their whole woodlands sprayed in order to control and prevent any serious attacks. Insects and fungi will spoil the effectiveness of the Luxury Forest by defoliation, or similar injury which effects the beauty of the plant material. Insects which are decidedly injurious to the Luxury Forest are those which feed on the leaves, sap suckers, twig girdlers and borers. In this section of Pennsylvania the Golden Oak Scale is causing much concern. The Japanese Beetle is also very harmful to the foliage of the trees. When any agency is found working against the general health of the trees, causing an unhealthy appearance, steps should immediately be taken to correct the evil. Among the fungi there are only a few which would actually prove serious. Leaf spots, mildews, and the like are usually only local and seldom will seriously effect the health of the tree. They must be dealt with in a manner comparable with the amount of damage they do. When planning any control work the thought should be kept in mind that every tree or plant in our woods is highly desirable. The degree to which it is desirable and necessary to the whole stand will determine the amount of protection it should get.

I have given many factors influencing the building of a Luxury Forest, but one I have not mentioned. That is the personality of the builder. The man who works towards bringing a beautiful forest out of a nondescript woodland must be an artist. He must be able to visualize the results just the same as the man who works on canvas. The one works with paint and color to show on canvas what the other builds in reality. The degree to which a man has this sense of the artistic will greatly influence the results he obtains.

The subject of the Luxury Forest is a fascinating one to me, as I believe it is to all of us. It can never become a major line of endeavor for us all, but all should give it thought. Our park areas are the places where we as foresters can put into practice some of our own ideas concerning a Luxury Forest. "Beauty makes man noble" and there is no beauty so inspiring as that of Nature as found in the woods.

OLDEST TREES IN THE WORLD ARE MEASURED

THE task of measuring what are considered by engineers to be the largest and oldest living trees in the world today has recently been completed. As a result of this investigation the General Sherman in Sequoia National Park is thought to be the largest, and the General Grant tree in General Grant National Park is believed to be the oldest.

In measuring the trees and determining their height, volume in cubic feet, perimeter and diameter at various heights, the General Sherman tree was found to contain 600,120 board feet, or enough lumber to build forty five-room homes, covering three city blocks. One limb of this tree has a diameter of nearly seven feet at its base.

The General Grant tree with a volume of 542,784 board feet has a larger perimeter at the base than the General Sherman tree and is known to be the older of the two. It has been estimated that both of these trees would provide sufficient lumber to erect a one inch square fence railing extending from the Pacific to the Atlantic.—*The Forest Log*.

NEWS NOTES FROM FOREIGN FORESTRY

By Geo. S. Perry, Pennsylvania Forest Research Institute

1. Sugar from Wood.

A few newspapers have published the fact that Dr. Frederick Bergius and his associate, Professor Bosch, of Hanover Experimental Laboratories, Germany, were awarded the 1931 Nobel prize in Chemistry. Still fewer periodicals cite the work of Dr. Bergius which merited this distinction. His foremost achievement was the discovery of methods whereby solid carbon fuels, such as coal and wood, may be converted into oils and other volatile liquids, adapted to heat and power production.

Of still greater interest to foresters, farmers, and stock raisers, is his successful conversion of

wood cellulose, into sugars suitable for livestock consumption. The method is practical and cheap. It is based on the treatment of wood with concentrated (33% normal) hydrochloric (muriatic) acid. The reaction is cyclic, as virtually all the active reagent is recovered in condition for re-use again and again.

A factory making stock food from wood, according to the ideas of Dr. Bergius, recently started operation in Geneva, Switzerland. Another is under construction in Germany.

There may be some debate as to what bearing the wood-sugar magic of Dr. Bergius may have on the farm relief problem in America, but foresters and forest owners can view his achievements with unalloyed enthusiasm, since it may develop an unlimited demand for all sorts of wood wastes, as well as a market for all low grade material from the forest. Such a consummation would solve the major economic problem of forestry.

2. Canadian Paper Companies May Merge for Mutual Gain.

Toward the close of the last decade it became apparent that the pulp and paper industry in Canada was decidedly over-developed. Prices and profits fell as increasingly keen competition and ever greater production resulted from the construction of new mills and enlarged capacity of the old ones. A giant combination is now in the making at Montreal according to current trade news in this field. The International Paper Co. and Abitibi Power and Paper Co. are among the large concerns now negotiating. If Price Brothers and the St. Lawrence Paper Co. go in too, as seems probable, the merger will have capital resources of nearly \$800,000,000 and produce about half the newsprint paper made in the New World, or around 2,000,000 metric tons. The New York Times estimates the total annual newsprint paper production of Canada at 2,500,000 tons, that of the United States at 1,500,000 tons, Scandinavia and Germany 2,000,000 tons, and the rest of the world 500,000 tons. Of course, the United States consumes far more than it makes, as our forests are largely depleted of those coniferous trees whose wood fibres are best adapted to the manufacture of newsprint paper.

However, the darkest clouds have their silver lining, and if the big Canadian combine boosts prices at exorbitant levels, American mills will spring up in Alaska and the Pacific Northwest, or inventive genius will learn to make a satisfactory sheet for each day's history, scandal, sport dope,

stock tumbles, "ads," and all the rest, from the wood of our rapid-growing hard pines. Either of these developments would speed the progress of practical forestry very substantially.

3. *Silver-Fox Farming in Norway.*

From Scandinavia comes the information that the fox farmers of Norway now own a total of around 120,000 silver foxes of breeding age and about half this many whelps from the litters reared this year. Of course, these animals can only be "skinned once," but the harvest should henceforth be 60,000 or more pelts per year with a raw fur sale value of \$3,000,000 or more at present prices.

4. *Elk Hunting in Sweden.*

The Swedish State Forest Service which supervises big game hunting in that country, has just published figures on the 1931 kill of elk. The total was 5,288 as compared to 5,126 in 1930. This total included 2,274 bulls, 2,335 cows and 229 animals of undetermined sex. Although Sweden has a population more than half as great as Pennsylvania and is more than five times as large, yet relatively few persons hunt big game, and often the shooting season passes without a single fatal accident, in strong contrast to the usual accident list in American states.

A. R. Greising, Scout Executive, with headquarters at Hazleton, Pa., in a recent letter to the Bureau of Extension states: "Hazleton was named because it was located in what was known as Hazel Swamp, so-called because of the abundance of hazel nuts. I have talked with many people and it seems few have ever seen a hazel nut grow. We believe it would be a good civic turn if our Boy Scouts would plant a hazel nut bush in some suitable place in Hazleton and place a marker upon it."

A summary statement of forest land purchases in Pennsylvania under the 1929-31 appropriation of \$1,000,000 as follows:

Number of tracts purchased....	163
Largest tract	23,429 acres
Smallest tract	4 acres
Average size of purchased tracts	1,678 acres
Total area purchased	272,780 acres
Total price paid	\$756,045.09
Average price per acre	\$2.76

The area of State Forest land on January 1, 1932, was 1,542,299 acres, 68.5 perches, purchased at a cost of \$3,733,414.75. The average price per acre as of January 1, 1932, was \$2.42.

The Blue Mountain Eagle Climbing Club donated to the Department a tract of 40 acres along

the Appalachian Trail in the Blue Mountains, Bethel Township, Berks County, which was accepted by the Commission.

MINING COMPANIES PLANT FOREST TREES

MINING companies are among the largest industrial groups of tree planters in Pennsylvania. They have engaged in reforestation annually since 1916, and in that year applied for and received their first forest trees from the State nurseries. Since then 109 different companies have planted fourteen million trees. Thirteen mining companies planted 262,000 trees in 1931.

Forest tree planting by coal mining companies is of special interest because the mining industry is an immense wood consumer, a large land owner, and a heavy importer of timber. Their total annual wood requirements exceed 100,000,000 cubic feet, which is equivalent to the yearly growth of more than a million acres of well stocked forest. Practically all the wood used in the anthracite mines, and one-third of that used in the bituminous mines of the entire country is used in Pennsylvania.

Thirty-two Pennsylvania towns and cities planted nearly 250,000 trees last year in the reforestation of municipal watersheds, forests, and parks.

The city of DuBois has planted forest trees regularly for the past twelve years, and now has 152,000 young forest trees of many varieties growing on city-owned land. The city of Reading has planted 397,300 trees, and Pittsburgh 350,000. Other municipalities with plantations of one hundred thousand or more are Boyertown, Altoona, Fleetwood, Philadelphia, East Stroudsburg, and Ashland.

The year 1931 has been a successful one for reforestation activities in Pennsylvania. The total number of trees raised in the State nurseries and planted during 1931 was 8,624,985, of which number 605,300 trees were set out in the State Forests.

The income to the Commonwealth from the sale of forest tree seedlings and transplants to private planters for reforestation purposes amounted to \$15,301.09.

The continued demand for seedlings and transplants, in view of the business depression that has existed during the past year, is ample evidence of the public's endorsement of the reforestation movement in Pennsylvania.

STATE FORESTS AND FORESTRY IN NORWAY

By Prof. George S. Perry

NORWAY was long considered one of the backward countries of Europe in respect to forestry. The forests there were abused and destroyed without let or hindrance for more than a thousand years. Conservative and constructive treatment of woods and waste lands is as recent in Norway as in the United States, but results there are concrete. Practical forestry in the woods stands in sharp contrast to the theoretical and futuristic type which prevails in many sections of our own country.

The Norwegian forests under State administration are of two classes, depending upon whether or not their income is credited to the national treasury, or certain special funds. The contiguity and intermingling of the two classes are illustrated by the fact that in 1930 the number of forest rangers and guards employed on the national forests numbered 267, while 261 were responsible for the care of the "fund forests," but 161 of these men had dual duties and were concerned with both classes of land. The national forests total about 2,000,000 acres in area, while the "fund forests" have only a tenth of this extent but are of better quality and more accessible.

According to the current report of the national forest service, the lands were administered at the end of 1930 by two forest inspectors and 40 foresters. Four of the latter are engaged in forestry education in the higher forestry schools of the country, and two are connected with minor schools giving instruction in forestry. In addition, the official roster included two cruisers, 15 forest assistants, one nursery superintendent, and two sawmill managers, with a central office force of the "Director of Forestry" and his assistant, a bureau chief, eight secretaries and four other assistants.

During 1930 the national forests showed a net return of \$231,430 and the "fund forests" \$161,420—while wood and logs with a net value of \$91,900 were taken out by holders of special or "proscriptive" rights. This makes a total or net income of \$484,750 for the year.

Lands are still being bought for State forestry purposes. The largest purchase in 1930 was the lands of a lumber company in Central Norway. By this deal more than 62,000 acres of productive forest were secured for \$270,000. About 12,000 acres of this were suitable only for protection

forest management, 25,000 acres were of low site quality, and an equal area was of average productivity.

Proscriptive rights to use wood from the Norwegian national forests are a heavy and annoying burden. During the year 3,113,353 cubic feet of material were received by such users, in addition to more than \$16,000 in cash and other valuable perquisites.

Most of the State forestry in Norway deals with natural stands. Selection cutting is the usual practice. Seeding and planting work covered but a limited area, since the annual report here quoted lists only 566,315 trees planted, and about 100 pounds of seed used for direct sowing on the national forests.

Drainage work is quite important. Nearly 98 miles of new ditches were dug during the year.

The total annual cut for sale from the State forests was 7,587,000 cubic feet. Less than half this was disposed of as stumpage. Saw logs and trees of timber size made up the great bulk of the cuts.

The right to hunt and fish in these forests is also a considerable source of State revenue.

NEW PUBLICATIONS

AN ANTHOGRAPHY OF THE EUCALYPTS—By Russell Grimwade. Angus & Robertson, Ltd., Sydney, Australia. Price, 2/2/.

Seldom has a book of identification aroused in me more varied interest. This is partly due, no doubt, to my previous lack of appreciation of the complexity, the usefulness and the botanical uniqueness of the genus, *Eucalyptus*. To my mind the *Eucalypts* present a forceful illustration of the development of species through hybridization and environmental influence. No more interesting indication of the complexity of the genus can be cited than the necessity of depending for classification upon chemical analysis of the leaf or the modification or variation of one structure such as the operculum or bud cap.

Mr. Grimwade has been most painstaking that the work might be accurate. The monochrome prints are a distinct addition to the text both in illustration and artistry. The description, which is concise yet well assembled, covers 103 types of the more than 400 known species.

This monograph deserves the attention of all who are interested in tree life and particularly of those who wish to know more about the gums.

H. GLEASON MATTOON.

DOUGLAS FIR FOREST INTERCEPTS THIRD OF SUMMER PRECIPITATION

PRECIPIATION measurements made in the open and under a mature stand of Douglas fir during 118 summer showers in the Wind River Valley, Wash., by A. G. Simson, of the Pacific Northwest Forest Experiment Station, indicated that on the average the forest intercepted 34 per cent of the precipitation during these showers. With 8 to 12 gages so distributed that the density of the forest canopy over them ranged from 5 to 95 per cent, 777 measurements were made. The gages used in the open were placed one-half mile from the forest. As shown by the gages in the open, precipitation during the 118 showers ranged from a mere trace to 3.99 inches per shower, and totaled 48.38 inches. The average precipitation per shower was 0.41 inch, and the quantity recorded most often was about 0.04 inch. In the case of light showers, little or none of the precipitation reached the ground under the trees.

With 12 gages placed at 20-foot intervals, checker-board fashion, 522 additional precipitation measurements were made under a dense 25-year-old Douglas fir stand. These indicated interception of 43 per cent of the summer rainfalls. A small portion of this apparent interception, Mr. Simson remarks, was probably accounted for by run-off down the trunks of the trees.

Mr. Simson's report on his findings concludes with the warning: "In the absence of positive knowledge, it is dangerous business for the forest protectionist to assume that a summer shower has caused any significant changes in the fire hazard in the forest itself, regardless of the effect in the open."

The railroads of Pennsylvania require 450,000,000 to 500,000,000 board feet of lumber annually. They are the largest single wood consuming industries in the State and use more lumber than the State's entire lumber cut, which is from 300,000,000 to 350,000,000 board feet per year. The railroads of the country are the direct purchasers of 17.5% of the annual lumber cut of the country, and directly or indirectly consume 25% of the total.

Sixty-seven percent of the crosstie requirements of Pennsylvania's railroads are imported, but the growing and cutting of ties continues to be one of the most profitable forest industries for forest owners in the State today.

THE ROOF OF THE STATE

THE one hundred and twenty forest fire observation towers maintained by the Department of Forests and Waters are located on some of the highest elevations in Pennsylvania.

The Negro Mountain Tower in Somerset County, has a base elevation above sea level of 3,190 feet; the Blue Knob Tower in Bedford County, 3,075 feet; the Hayes Hill Tower in Somerset County, 2,940 feet; the Sugar Loaf Tower in Fayette County, 2,900 feet; the Lower Yoder Tower in Cambria County, 2,720 feet; the Statler Hill Tower in Somerset County, 2,705 feet; the Elk Hill Tower in Susquehanna County, 2,684 feet; the Bear Cave Tower in Westmoreland County, 2,630 feet; the Ricketts Tower in Wyoming County, 2,520 feet.

Thirty-three of the fire towers are located within the State Forests and eighty-seven on private lands. They are located in forty-seven counties of the Commonwealth.

At Fort Washington, Pennsylvania, on the top of the Fort Hill, stands a large tulip poplar tree which from a distance, by its form, gives the appearance of being a massive old white oak. The bark also resembles that of the white oak. In diameter it is 48.9 inches at breast height. The total height of the tree is 90 feet, with a clear length of 30 feet. The spread of the crown covers the ground over a 40 foot radius.

The old tree is still maintaining a fair rate of growth, increment borings showing an average of 12 rings per inch. No record of its age is to be found—an estimate would place it at about 200 to 250 years old—*John W. Tyler*.

Facing the town of Jerusalem, across the Kedron Valley, is a slope, which at the time of Christ contained a flourishing grove of olive trees. The hill was accordingly known as the Mount of Olives, a place of numerous Biblical references. At the present time this slope is part of a garden, in the Franciscan portion of which bent, wrinkled olive trees are still growing. Beneath these trees Jesus is said to have prayed.

Because of their Biblical associations the leaves of the olive trees are highly prized by the thousands of religious pilgrims who visit them. Their oil sells for fabulous prices, and their seeds, made into rosaries, bring what is perhaps the highest price of any tree fruit in the world.

DEPARTMENT OF FORESTRY

STATE COLLEGE

PA

FOREST LEAVES

JULY, 1932



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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 324 Commercial Trust Building, Philadelphia.

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1932 SUMMER MEETING

ARRANGEMENTS have been made for holding this year's Summer Meeting at and in the vicinity of Doylestown, on June 23rd and 24th. This is in a region rich in natural beauty and historical interest, and within convenient motoring distance for residents in the southeastern portion of the state.

The program as outlined is:

Members and guests will meet at 10.30 A. M. (Daylight Time) at the Historical Museum in Doylestown, a large building easily visible and found. Here can be seen a remarkable assortment of early American tools, implements, utensils, etc., a very complete and interesting collection which since its assemblage has attracted many visitors.

The party is asked to be at the Fountain House in the centre of Doylestown at 12.45, so as to be ready for lunch at 1 o'clock. At 2 P. M. the delegation will leave the Fountain House for a visit to Fort Hill (nearby) to see the Arboretum, Bird Sanctuary and an interesting house (known as The Castle) built entirely of tile by one of our former members, now deceased, Mr. Henry C. Mercer. The tile works are immediately adjoining. At 5 o'clock we go to the home of a member, Mr. William Mercer, where there is an interesting assortment of trees.

That evening, at 8 P. M., there will be a brief meeting in the Auditorium of the Doylestown High School, with several short addresses on subjects interesting to our members.

The next day, June 24th, the party will leave the Fountain House by automobile, at 10.30 A. M., motoring via Bauman's Hill to Washington's Crossing, where a memorial tree will be planted in the Park. Luncheon will be at 12.30 o'clock, so that the delegation can leave at 1.30 to return via New Hope and Laurel Drive, thus enjoying the beauties of the famous drive along the Delaware which has a particular charm and beauty. On the return trip a visit will be made to the Farm School and the adjoining Fordhook Farms, owned by our member, Mr. David Burpee, where lovely flowers will be enjoyed. The delegates will be

welcomed at tea by Mr. Burpee and Mrs. Irvin W. James, which will terminate the meeting.

Doylestown is on the main highway between Easton and Philadelphia, and can also be reached by the Philadelphia and Reading Railroad or by motor bus.

Members are requested to promptly advise the Secretary, Carl P. Birkinbine, 324 Commercial Trust Building, Philadelphia, Pa., if they can attend, and to state whether they desire automobile transportation to be supplied, or if they will have room for any others in their cars. This issue of our magazine has been sent out early so as to advise our members of the plans for the Summer Meeting. We believe that those who attend will find much to enjoy and interest.

EDITORIALS

FIFTY years ago the first Arbor Day was celebrated due to the suggestion of Hon.

J. Sterling Morton, then Secretary of Agriculture. Since then the idea of Arbor Day has taken hold on the people, until now it is an established custom over the United States. The significance and the fruits of this idea were recognized by our national legislators, who authorized the issuance of a special commemorative 2 cent postage stamp, which was first put on sale at Mr. Morton's home, Nebraska City, Neb., and at Washington, D. C., on April 22nd, the anniversary of the first Arbor Day, and which date was this spring designated by the Governor as an Arbor Day in this state. Whether or no our readers are interested in philatelies, they will appreciate that by this time copies of this commemorative Arbor Day stamp are in the possession of many thousands of stamp collectors. Certainly an engraving (of a boy and a girl planting a tree), which is treasured and viewed in every country on the globe can be termed a universal sowing of the seed of forestry and what it means.

UNDER the news of 25 years ago, the *Public Ledger* of April 14, 1932, stated, "President Roosevelt, in an Arbor Day message 'to the school children of the United States,' had

said, 'It is well known that you should celebrate your Arbor Day thoughtfully, for within your lifetime the Nation's need of trees will become serious.'"

In the quarter-century which has elapsed since President Roosevelt gave this message hundreds of millions of trees have been planted by many agencies, ranking from the Federal Forest Service to the work of many individuals. Also in that interval more states have adopted a policy of reforestation and of protection of existing stands of timber, and many organizations, not directly affiliated with the lumber industry have become cognizant of and have urged the necessity of planting trees for the future welfare of the nation's citizens.

With all the aid given to the movement, our rate of cutting is still many times the rate of growth, and a still larger program of reforestation and protection is essential and necessary. In this movement the Pennsylvania Forestry Association has for over 46 years been an active sponsor, and the citizens of our state can view great areas of what was once waste land now covered with growing useful trees, and the erosion of soil retarded.

Too few realize the situation, and hence we bespeak for the movement the cooperation and interest, not only of our members, but of all those who realize that fairness to future generations demands that we replace those restorable natural resources which we are now using. You can help by telling others of the work.

YIELD OF PRIMEVAL TIMBER STANDS IN PENNSYLVANIA

IT is well known that Pennsylvania was one of the best timber states in the Union, and this fact led to naming the State by Latinizing the words Penn's Woods.

Were the crop of timber two hundred years ago reckoned as the lumberman of today would scale it, yields of 30,000 board feet of lumber per acre would not be uncommon.

White pine often exceeded hemlock in volume of the stand. A yield of 50,000 board feet was not unusual for an acre of white pine.

The northern hardwoods, beech, birch and maple, when mixed with hemlock aggregated from 2,000 to 3,000 board feet additional lumber per acre.—*Service Letter, Pennsylvania Department of Forests and Waters.*

THE COST AND CURE OF EROSION

An Address by Secretary of Agriculture,
Arthur M. Hyde

SOME pages in human history reflect no credit upon mankind. First in importance is that page which describes man's treatment of the soil.

Man was placed in a garden. He has transformed vast areas of it into desert. He has destroyed the cover on thousands of acres; he has laid waste wide stretches of pleasant country; he has made human life all but impossible in many places. *as in the case of the soil.*

The world is full of examples. Mediterranean nations now eke out a bare existence where once they maintained a flourishing civilization. China periodically suffers from famine brought about by man's own destructive hand.

We in America are fortunate. We still have time to choose between conservation at low immediate cost, and continued exploitation at an outrageous ultimate cost.

We, too, have inherited a garden which we have fully possessed. We have been too busy with our works to take stock of our possessions, how they have been obtained, what has been or is now happening to them. It is time to give serious thought, from a national standpoint, to the land.

We have cleared and populated the Atlantic seaboard. This was done joyously if not recklessly. Now we find our cities looking for good drinking water, our agriculture suffering because the fertile top soil is gone.

Later we took possession of the Trans-Allegheny region. Here again, we now find farm lands impoverished by erosion, and consequent abandonment. Expenditures for flood control and dredging are increasing tremendously as valuable lands and cities are threatened and as navigation is made more difficult.

We crossed the prairies and took possession of the more arid regions where we supplemented rainfall with irrigation and boasted that we had made the desert to bloom. Here again our methods have been heedless. By overgrazing the grasslands and by cutting and burning the forests, we have endangered the very existence of the engineering works of which we boasted. More, we are threatening the future of the people as ground waters are lowered and cities must go miles for their water supply.

Nevertheless, we are fortunate. There is yet time to reverse the destructive forces. We can not

wholly escape the consequences of past action, but we can minimize them. And America can, if she will, show the world that man can possess, without destroying, the land.

Erosion is merely the first cost that this country is paying for ruthless, unthinking exploitation of its land resources.

Erosion, as most of you know, is the eating away of the soil, caused, as a rule, by unrestrained water flowing downhill, transporting stones, sand, and fine soil material, with its invaluable organic matter and available plant food, and depositing it on the surface of lower-lying areas or in the streams. Sometimes the finer soil is eroded by the wind and deposited on another farm. What is one man's loss, is sometimes another's gain. More often, it is the coarse sand, boulders, and stones carried down by moving water which are deposited on the fertile land of another farm. What it one man's loss is then another man's disaster.

This sort of erosion, largely man-made, can be measured in years. Contrast it with the centuries nature has taken to form the soil. According to our erosion experts in the Bureau of Chemistry and Soils, it takes nature not less than 400 years to build up one inch of the rich topsoil characteristic of the rolling parts of the Corn Belt. By planting corn continuously in that area, man has permitted erosion to remove that inch of rich topsoil in from 10 to 50 years, depending on the steepness of slope. The average depth of topsoil in much of this region is only about 7 inches. In other words, 2,800 years of soil-building by nature is utterly destroyed by man in little more than two generations.

Man achieves his fatal efficiency as a destroyer by processes which are entirely preventable or controllable. He cuts off the forests over large areas. He burns the ground cover, exposing the land to the washing of surface water. He overgrazes the original prairies and by destroying much of the grass vegetation, leaving the soil to the mercy of the running water; and he plows the slopes against rather than with the contour of the land.

Two sets of consequences ensue, one affecting our soil fertility, the other our water supply.

Erosion removes not only the fertility of the soil on the farm and range, but removes the soil itself. As the humus soil covering and the moisture reserves of the soil are lost, fertility on the farm and carrying capacity on the range disappear. The tillable areas actually decrease because of gullying, and the expense of cultivation increases where erosion has begun to divide fields into plains and valleys.

In many parts of this country, from 10 inches to 2 feet of the topsoil has been removed in less than 30 years.

All the crops in the United States annually remove about six billion pounds of plant food from the soil. Erosion annually removes about 21 times as much.

As a minimum, it has been estimated, some 500 million tons of suspended materials are discharged every year into the sea by rivers. What reaches the sea is, of course, the finest, most minute material. The heavier sand, pebbles, and rocks are stranded somewhere along the way to form sand bars, new river bottoms, or new banks. For every ton of sediment that reaches the sea, at least two tons are stranded somewhere on the way. At a conservative estimate, our soil scientists say, one and a half billion tons of eroded material gets into our river channels, and into the sea every year. To replace all the plant food thus lost would at current fertilizer prices cost millions of dollars annually.

Already in this country 21 million acres have gone entirely out of cultivation because of destructive erosion. This exceeds the total area of arable land in Japan proper. But far more than 21 million acres has been impoverished by the slower type of sheet washing, which carries off a portion of unprotected slopes every time there is enough rain to cause water to run downhill. . . .

Normally, part of a rainfall may run rapidly off towards streams and lakes, but a very large part is absorbed into the soil. It forms the sheets of ground water, from which we derive water for wells, and springs, and which keeps up the regularity of stream flow. It is this part of the rainfall which sustains life for both plants and animals.

Anything, therefore, that can catch the precipitation, retain it in the ground to be used by plants, build up the ground waters and prolong the period between its arrival on the surface and its ultimate passage to the streams, is beneficial to nature and mankind. If we could retain every drop of precipitation in the soil, we would not need to worry about soil fertility, about climate, about silt in the streams, or about floods and low stages in rivers and lakes.

As you know, the capacity of the soil to absorb and retain water depends in considerable measure upon the presence of humus organic matter in the soil. If a forest is cut off and burned, if a field is allowed to lose its topsoil and the contained organic matter, the absorptive capacity of the soil is reduced.

Water falling on such soil runs off rapidly, picks up part of the soil surface and carries it to the streams as sediment. Result: Farms lost fertility and soil, small streams are choked, streams are filled with mud, navigation on larger streams is made hazardous and costly, and, most important of all, the region becomes impoverished for water. The ground waters are lowered, wells dry up, and springs disappear. Even though annual precipitation remains constant, we may have what approaches a drought, because the natural cycle of water and soil relationship has been shortened and disturbed. . . .

For every pound of grain that is grown, for every pound of meat that is produced, many times their weight in water is required. A pound of bread is the equivalent of two tons of water used by the growing grain. A pound of beef is the equivalent of 15 to 30 tons of water consumed by the beef animal, both directly and indirectly through feed. And if you are inclined to revel in vivid statistics, consider this: the adult who eats 200 pounds of bread and 200 pounds of meat in a year, consumes the equivalent of 4,400 tons of water—which ought to be enough to drown both him and the statistician who figured it out.

This consumption of water for crop and animal production, and for the use of man and animals, however, accounts for only 30 per cent of the actual loss of water indicated by the lowering of the wells. The dominant cause of that depleted water supply is the loss of rain and snow water through surface run-off unretarded by adequate cover, particularly during the non-growing season. The depletion of our reserve water capital, upon which the agriculture of this country depends, is therefore intimately connected with the destructive floods and soil erosion we are coming to know too well in this country. . . .

We can make it a matter of general policy to discourage the cultivation or overgrazing of lands too steep to escape erosion except when protected by a cover of vegetation. It may be wise to develop our national forest policy to provide for maintenance of a dense forest or grass cover on critical watersheds, having regional or national importance. When State and national finances permit, it may be wise to extend our forest policy to cover soils subject to excessive erosion. Similarly, grazing must be regulated on the western ranges of our remaining public domain in order to prevent disastrous erosion.

Once the few fundamental facts about erosion

are understood, the remedies become perfectly clear. The situation is simply this: there is only one fundamental way to control navigation and regularity of streams, to protect fish, and to maintain normal climatic conditions and abundant crops, and that is by retaining in the ground itself as much as possible of the precipitation falling on the ground, and by retarding as much as possible its run-off from the surface of the soil. . . .

There are those, no doubt, who think of forestry as primarily a conservation program designed to protect our forests as a source of wood supply. Even from this standpoint forestry is amply justified. But forestry has a vastly wider meaning, and a much larger importance when considered as a part of a broader program for the conservation and wise use of the landed estate of the Nation.

Is the agriculture of large areas—even of whole States—in dire distress? Look first for causes in the kind, character, and economic location of the land. Perhaps a semi-arid prairie has been plowed ill-advisedly during a period of high prices, or a series of years of more than average rainfall and the attempt is being made to wring a living by cultivation from land which Providence designed for grazing. Perhaps a naturally thin soil has been devastated by too much or an unwise cultivation; so that the best of men and the best of methods could not wring an American standard of living from it. In the one case, the restoration of the land to grass, in the other its reforestation, may be the answer. In either case an answer must be found, if American agriculture is to be saved.

This Nation has incomparable resources in land, labor, and capital. No less important is the intelligence with which these assets are utilized. The individual farmer will have to show resourcefulness in meeting changes in world economic conditions. He needs to adopt every economy of production. He needs to recognize handicaps, natural and economic, that foredoom him to failure. But it is no less vital that the Nation, in the interest of a profitable agriculture and a balanced national life, shall promote a wise utilization of our resources. Our traditional national policy of planless agricultural development should be replaced without delay by a program based upon such a utilization of our land resources as will yield greater economic and social values, will stay erosion and soil depletion, will preserve and conserve our land inheritance, and limit our agricultural plant to such a size as will supply the Nation's needs, without the ruinous blight of overproduction.

MERGER ABOLISHES FOUR NATIONAL FORESTS

UNDER Executive orders recently signed by President Hoover, in the interest of more economical administration of national forest lands in Montana the number of national forests in that State has been reduced from 16 to 13. The lands formerly constituting the Madison, Missoula, and Beartooth National Forests have been distributed among other national forests, and some other boundary changes have been made. Similar action has been taken by the President respecting three of the national forests in the State of New Mexico. The Datil Forest has been abolished and the lands formerly included in it have been transferred to the Gila and Manzano National Forests. The name of the latter forest has been changed to "Cibola," commemorating the "Seven Cities of Cibola" which were sought by the early Spanish explorers and which were supposed to lie in the locality where this forest is situated.

By Executive order of February 25, 1932, the boundaries of the Bandelier National Monument, in the State of New Mexico, were slightly modified, and jurisdiction over this monument was transferred from the Forest Service of the Department of Agriculture to the National Park Service of the Department of the Interior.

THE LANDING OF THE PILGRIMS

WHAT manner of trees were those which tossed their giant branches against the stormy sky as the Pilgrims landed? They were pines, oaks, chestnuts, and walnuts, even on Cape Cod.

There is a tradition that the Pilgrims brought with them specimens of their favorite trees. At any rate, when the community began to assume the proportions of a town and streets were laid out, European trees made their appearance. Most of the native trees had been cut and hewn into timbers for homes. Invariably the linden and English oak were the trees selected and imported for shade tree planting.

The planting of such trees in the New World was a mark of affection for things held dear in the Old, and the symbol of a friendship which even the misunderstandings of Revolutionary times could not shatter. America abounds with oaks, lindens and elms thus planted.—James Raymond Simmons.

MAN-CAUSED FIRES INCREASED IN NATIONAL FORESTS IN 1931

FOREST fires started by the carelessness of campers and smokers in the National Forests in 1931 increased more than a third over 1930, final regional reports to the Forest Service show, the U. S. Department of Agriculture announced. Neglected or escaped campfires caused 37 per cent more forest fires than in the preceding year. Dropped matches and burning tobacco ignited the woods in 1,872 places, an increase of 31 per cent.

When the average of the last 5 years is taken into account, a comparative increase of 49 per cent in smokers' fires is found. The number of visitors to the National Forests has grown by many millions in recent years, but the smokers' fires have more than kept pace. More of the visitors smoke, but not many more seem to remember fire hazards, according to Forest Service fire fighters. Offenders have been arrested to curb carelessness with burning tobacco, but chiefly the Forest Service is trying to depend upon educational measures to acquaint smokers with fire danger.

Incendiaries caused fires in many forests in 1931, but taking the National Forests as a whole, the increase was held down to 12 per cent for the year. Yet this showing is not so satisfactory, officials say, since there were 56 per cent more incendiary fires last year than the average of the preceding 5 years. The force of local opinion came to the aid of forest protectors in many forests last year, owing to heavy losses of life and property from this type of fire.

Fires caused by railroads decreased 4 per cent for the year. Fires resulting from lumber and logging operations also decreased. Man-caused fires as a class increased 27 per cent, with 5,549 such fires recorded. All fires in the National Forests in 1931 numbered 8,466, against 8,388 in 1930.

Nature was kinder than men to the forests, despite the droughts in some regions. Fires caused by lightning numbered only 2,917, the lowest figure since 1923.

Thanks to improved equipment, roads, and training, Forest Service crews were able to partly offset fire carelessness in 1931. A new record was attained in putting out fires before they reached large size. On account of the increasing accessibility of the National Forests, fire losses in future will depend more and more upon the care and foresight of the public, the Forest Service says.

A PASSING WOOD USING INDUSTRY

By Assistant Forester John W. Tyler

ADVANCES made in the perfection of the automobile wheel, together with the rapid decrease in the use of wagons, has practically eliminated the once busy industry of wood bending. Years ago there were a number of these industries thriving in the Valley Forge District, and supplied many bent wood products.

At the present time Hoopes Bros. and Darlington of West Chester have a wood bending plant in operation. Thomas Hoopes states that hickory and white oak are the two kinds of wood used and that wood produced locally, when free and clear of knots, is very desirable. Some of the wood is brought in from the Southern States.

The bending process is rather simple. The grain of each piece should be from side to side and not across the corners. This is to reduce the danger of shearing along the grain, which is frequently caused by unequal pressure which naturally develops during the bending process.

The next operation is the steaming, which requires from 30 minutes to two hours, depending upon the size of the wood. It is then ready for bending. The machine for doing the bending work consists of a heavy upright frame with a horizontal table. The wood is placed on steel belts upon the table with the end clamps tightened against the wood, thus placing an endwise compression force on the wood.

A form of the size and shape desired is then placed on the wood and clamped into position. Two chains, one on each side of the machine, are hooked to the end of the belt and run over the top of the upright frame to the source of power. As the power is applied the chains draw the wood into the desired shape around the form. Wheels, rims and bus roof bows are built in this manner. For the building of wagon tongues and shafts, a slightly different machine is necessary. S bends are made by pushing the wood into a form by the use of a system of levers.

In the first method the belt with the clamps helps to keep the outside of the belt from splitting by keeping the outside of the wood at its original length. The inside of the bend is thus subjected to a compressive force. Immediately following the bending, a device for preventing the piece from straightening out is placed upon the wood and the material left in the form four to five hours.

Kiln drying the bends requires about 30 days

after the forms are removed. It is interesting to note that the bent wood has a tendency to bend still further during the drying rather than to straighten out as might be expected.

The final operation is the finishing of the piece into the designed product.

Three men can bend 1,000 wheel rims per ten-hour day, and six two-inch rims are bent at the same time, as the belts are 12 inches in width.

ECONOMY PROGRAM SCALES DOWN BRITISH AFFORESTATION PLAN

GREAT BRITAIN'S economy program approved by Parliament in September, 1931, cut practically in half the expected appropriations to the forestry commission for 1932 and subsequent years of the decade beginning with October, 1929. Under the previously existing policy, appropriations to the commissions during that decade would have totaled £9,999,990. The decrease in the 1932 appropriations is £478,000. Acquisition of land was to have proceeded at the annual rate of 60,000 acres of plantable land and 2,500 acres of cultivable land, the latter to provide for additional forest workers' holdings. Planting operations, which covered 24,721 acres in the year ending with September, 1930, were to have been "stepped up" to 44,000 acres a year by 1938. It is anticipated that under the new program afforestation will be restricted to 20,000 acres per year and to land already acquired.

On the basis of calculations made by the forestry commission the select committee on estimates reported in 1929 that about three-fifths of the commission's expenditure might in certain circumstances be expected to yield a net return of as much as 3.7 per cent, but that the remaining two-fifths would yield a small return or none. Spread over the whole operation, the returns would average from 2 to 2½ per cent. The committee that formulated the Government's economy program held that as an investment of the national resources an estimated return of from 2 to 2½ per cent "has no attractions." As against the prospect of higher prices for timber "in the remote future" it urged the probability of the development of substitutes for timber and of forestry development in lands where it can be carried out more cheaply than in Great Britain. Considering afforestation as a means of settling the unemployed on the land, the committee stated that to find full-time work for one man in this way cost £140 per annum and that the capital cost of providing a forest worker's

FIRE PREVENTION FOR PROTECTION OF FORESTS

By R. Y. Stuart, Chief Forester, United States Forest Service

PICTURE what this country would be like without forests. It would certainly be desolate. We would have to import at heavy cost the material for the thousands of uses that wood is put to. Our flood problems and our water supply problems would be vastly increased. Our rivers would become scourges, descending upon us in fury in one season, and failing us altogether in another. And we would be denied the finest type of outdoor recreation—the type forests alone can afford.

We must have forests. And if we are to keep them, we must protect them. Fire is the scourge of the forest. There must be organized effort to prevent and fight forest fires as there is to prevent and fight city fires. Fire in the forests devours not only accumulated wealth, but it also licks up natural elements necessary to quick replacement of that wealth.

Farmers naturally have special interest in forest protection. They and other small owners hold more than one-third of the timberland in the United States.

Let's see what a timber fire means to the farmer. It will destroy or damage valuable standing timber in his woodland. It kills the young reproduction that will bring future returns and increase the present value of his land. It increases soil erosion, and reduces stream flow and springs during the dry season.

Fire on the farm or in the farm woodland may do all these things, besides reducing the fertility of his woodland soil, burning the fences, and possibly spreading onto cropland and farm buildings.

While the general public must suffer from forest fires, it is still often to blame for letting the fire demon loose. More than half of all fires start from such simple beginnings as the careless dropping of a match or tossing of burning tobacco from an automobile, or failing to watch the trash fire or to properly extinguish the campfire.

Fire prevention, like charity, begins at home. Matches, gasoline, and such things have known dangers as well as uses. When every man realizes it is his personal interest to stop the red destroyer whether at home or in the forest, fire losses will be greatly reduced.

Wherever he goes, he must remember that one

holding whereon a man can find part-time employment to supplement his work in the forest is estimated at from £400 to £600.

The minority of the committee reported in part as follows:

"This is particularly one of those forms of development which must necessarily be done by the State if serious attention is to be given to it at all. Its value can not be judged from a purely commercial standpoint, and the commissioners have ample justification for the attitude they have adopted toward their functions when they state that 'the object of afforestation is not to provide a remunerative investment for State funds but to meet certain deficiencies in the economic organization of the country which otherwise would not be made good.'

"It was represented to the committee that one of the considerations in mind when the present scheme was started was the bulky nature of timber as an import and its consequent heavy demands on tonnage. As a factor to be taken into account in the event of war the necessity to import timber would be a serious consideration * * *.

"Another important feature is that excessive forest depletion is at present going on in most parts of the world without adequate replacement by new planting * * *. In Great Britain, with the break-up of estates, woods are being felled and not replanted. That process is likely to be accelerated and the work of the commission remained as one of the few efforts to reconstitute rural Britain.

"The commission are obtaining land on favorable terms and they do not anticipate that there is any prospect of a further fall in value * * *.

"* * * The recommendations in the main report would, it appears, involve the gradual abandonment of any considered forest policy * * *. It must not be overlooked that this country imports timber products to a value of between £40,000,000 and £50,000,000 per annum, a large amount of which is finished material."

Sir Roy Robinson, the technical commissioner of the forestry commission, has stated that despite the curtailment of the program he will be able to maintain the integrity of his personnel and the continuity of the research work.

The U. S. Forest Service in 1931 constructed 4,238.3 miles of forest roads in 39 States and Territories. The 1930 mileage was 1,725.6. Trail building increased 23 per cent. Operations were pushed to open up inaccessible areas in national forests where fire danger was greatest.

second of fire carelessness may destroy a tree or a forest that it perhaps took Nature 100 years or more to produce, and in destroying it he is removing from the earth something of value that he may not live long enough to see replaced. The organized protection agencies are grateful for the public support they have received, but before fire losses can be further reduced unfailing and increasing public support is necessary.—*United States Daily*.

George S. Perry of the Forest Research Institute at Mont Alto has contributed an interesting news item from Sweden. During December, 1931, a terrific storm that swept across central Sweden laid waste to more than 400,000 acres of excellent forest containing trees of merchantable size. It is not possible to market all the wind thrown timber at once, especially since business is dull. About a third of the forest is owned by the government and this stumpage will be held off the market as long as possible in order to favor private owners.

With these facts in mind the Swedish Forest Service has bought and is erecting 3,000 bird houses throughout the devastated region. Bark borers and wood boring insects will cause the wood of the fallen trees to deteriorate and decay. The authorities hope that by erecting homes they may attract an army of feathered guards to hold the insect hordes in check.

Dry wood is as much as two and one-half times as strong as the same wood in the green, or natural growing state, says the Forest Service, of the United States Department of Agriculture. The strength of the dry wood compared to green wood varies with the type of tree, the amount of moisture it contains, and similar factors. The Forest Service has studied the problem of moisture and strength in wood for the last 25 years and has worked out formulas for finding the strength of wood under different moisture conditions.

Fire is the greatest enemy of the forest. It injures or kills standing timber; destroys seedlings and young growth; reduces the fertility and moisture content of the soil; increases floods and erosion; drives away game and other wild life, destroying its necessary food and cover, and makes the forests unfit for recreation and enjoyment.

TIMBER, WATER AND RECREATION

By Assistant Forester D. B. Bonebrake

THE drought in 1931 clearly evidenced the importance of water as a necessary element to human welfare. Pure and abundant water supplies are necessary for a prosperous and productive community.

Towns and cities are found in particular locations on account of some commercial incentive. Frequently the water supply must be obtained from regions and streams which are contaminated, which means expensive filtration systems for the purification of water. Fortunate are the cities so situated with regard to their water supplies that possible contamination and expensive filtration systems are not factors affecting public health and taxes. Waynesboro, Franklin County, Pennsylvania, a town of ten thousand inhabitants whose water supplies are obtained almost entirely from the forested watersheds of the Mont Alto State Forest is among these more favorably situated municipalities.

Located in the beautiful and historical Cumberland Valley, Waynesboro is fortunate in its proximity to the South Mountains of Franklin and Adams counties, where pure water in abundance is obtained. The watershed area of Waynesboro contains 7,808 acres of which the borough owns three tracts totaling 420 acres, situated at points along the Antietam Creek, affording the best possibilities for reserve storage. Fortunately this area has been protected from forest fire for fifteen years resulting in a generally even growth forest.

The Bailey Spring holding on Bailey Run, now used as a reserve supply since the development of the Old Forge project, was the first development of the Waynesboro Water Company. This holding contains six hundred and twelve acres with an annual average runoff of 26,680,500 cubic feet of water drained by Bailey Run which flows into the East branch of the Little Antietam between Roadside and Glen Furney. A dam of loose rock and earth placed across a gradually broadening ravine holds an adequate amount of water which is connected to the city mains to be used if needed.

Little erosion of the alluvial soil deposit of Weaverton and Mont Alto sandstone is indicated. A sufficient forest cover, from which "dead chestnut" fire hazards have been removed, is present for moisture retention. The soil is porous, as indicated by the absence of mountain laurel.



OLE BULL PUBLIC CAMP GROUND, POTTER COUNTY, PA.



RHODENDRONS, SOUTH MOUNTAIN, FRANKLIN COUNTY, PA.



JAPANESE CHESTNUT, MILROY, PENNSYLVANIA



EGGS IN NEST OF RUFFED GROUSE, STATE BIRD OF PENNSYLVANIA, COOK STATE FOREST PARK, PA.
Photos Courtesy Department of Forests and Waters



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EGGS IN NEST OF RUFFED GROUSE, STATE BIRD OF PENNSYLVANIA, COOK STATE FOREST PARK, PA.
Photos Courtesy Department of Forests and Waters

An area of 7,196 acres drains 313,457,760 cubic feet of water into the Little Antietam Creek, east of Old Forge. Adjacent and above the site of the original Old Forge Dam which held the impounding waters of Rattlesnake Run and the Antietam Creek, the borough purchased twenty-five acres on which was built a 5,000,000 gallon settling basin in 1927 and 1928 at a cost of \$50,000.

The settling basin serves a dual purpose. Daily water consumption averages about 3,000,000 gallons. The reserve and continual flow keep the basin at a constant level, affected only by abnormal conditions. Observations made at the time of severe drought indicated a sufficient flow and pressure.

The topography of the country permits the use of a gravity system, cheapest and most reliable. a fact envied by many municipalities. The comparatively short distance required to pipe the water and the twenty-five foot difference in elevation insure an equal pressure throughout the city below the storage reservoir on North Broad Street.

Old Forge is a community center, having been developed by the Pennsylvania Department of Forests and Waters. Camping facilities and other recreational features maintained by this Department make this region attractive to thousands of people. Good forest roads and trails attract hunters and fishermen. The David Baer Y. M. C. A. Camp of Waynesboro is developing a permanent camp which each year represents a considerable investment in teaching our school children good citizenship. This region abounds in interesting South Mountain history and folk lore concerning the era of the operation of iron furnaces during the years 1807-1892.

Should it be needed, an additional dam site is obtainable above Swift Run. A small embankment between the cliffs through which the Antietam Creek flows would flood a large acreage to an eight-foot depth, thus preventing a water shortage at a minimum expenditure.

A similar site is also available near the headwaters of the Antietam Creek at Cold Springs. A ten-foot embankment 35 feet wide would flood a 50-acre area holding a large quantity of water. Because of the well chosen site of the settling basin and intake dam it will be possible to establish additional emergency reservoir sites as needed in nearly every part of the watershed.

A planting project both for sanitation and beautification on the site adjoining the settling basin would prove inexpensive and act as a soil

and moisture retainer. Studies made with red pine indicate the best possibilities.

It is quite evident that the continuance of an abundant and pure water supply depends largely upon a program of forest management and protection from forest fire.

THE JAMES WHITE MUNICIPAL FOREST

By E. C. Pyle, Assistant District Forester, Susquehannock Forest District

NEAR the headwaters of the Allegheny River in Potter County lies the Borough of Coudersport. This town with a population of 2,800 has the distinction of having one of the first municipal forests in the State. In 1922 a gift of 100 acres of woodland was made to the Borough to be used as a Communal Forest. This idea was derived from the Communal Forests of Europe, where the revenue from such forests pays, in most instances, the road and school taxes so that there is very little taxation, if any, in towns having Communal Forests.

Using the words of the deed, this gift of land was made "December 15, 1922, between * * * heirs at law of James White, deceased, late of Coudersport, Pa., grantors, and the Borough of Coudersport, grantee, in consideration of the establishment of a memorial to James White, father of the grantors * * *. The above described tract of land shall be known and designated as the *James White Municipal Forest*."

Harold F. Port, District Forester at the time, made a detailed examination and report, and the area was then designated as a Municipal Forest as provided by law in accordance with Act approved April 22, 1909, P. L. 124.

Delving into the old deeds of this tract, it was learned that originally it was in the name of the Bingham Estate. The Bingham gained title from the Commonwealth around the year 1795. The tract has changed hands only six times since that date. James and Homer White, the last owners, bought the 100 acres on October 31, 1905, at a sheriff's sale for \$85.00. It is also interesting to note that in the transfer of this land in 1886, the hemlock timber and bark were reserved for three years. Today only an occasional hemlock tree and a few scattered saplings can be found.

This forest is located two and one-half miles north of Coudersport and about one-third of a mile up Gordon Hollow from what is known as the "Chicken Farm" or the Joe Grom place. An old

abandoned township road extends up the hollow and divides the forest into two equal parts. For the purpose of description, the area will be designated as the north and south block with reference to the road, which runs east and west.

The soil is of a shale formation, the top soil being loam with small rocks and boulders of conglomerate quartz.

The southern block is mainly a northern exposure and thus, is well covered with second-growth beech, birch, maple and scattered hemlock, wild black cherry, ironwood, basswood and cucumber. The only poorly stocked part of this block is that between the road and the stream. However, most of these open spaces were planted seven years ago.

The northern block being a southern exposure has suffered from frequent fires in the past and therefore, is covered rather sparsely with valuable tree growth. The ground cover consists mainly of fire-cherry, aspen, soft and hard maple, dead and sprouted chestnut, red oak, yellow and black birch, black cherry, Juneberry and mountain ash. The most of this cover is in clumps with bracken fern, briars, laurel and bush honeysuckle between. Here the largest of the open spaces have been planted.

The forest in general has a variety of trees and shrubs and is unique in that it has two of the main forest cover types of Pennsylvania within its boundaries, namely: the beech-birch-maple and the oak-chestnut types. The former is found on the southern block and the latter on the northern.

Not only will this forest interest the botanist but also the geologist, ornithologist and the ordinary nature lover. Because of the absence of huge rocks and boulders in Potter County, the northern block of this forest is unique. Here along the northern boundary we find dozens of magnificent specimens of mountain ash 15 to 35 feet high nestling in the protection of immense boulders looming up 30 to 40 feet in some places. Here one feels that he is in a foreign land. The tropical-like mountain ash, scattered here and there among the boulders, crevices and natural hiding places, gives the Potter Mountain something to gaze upon. The mountain ash trees are the most prolific and healthy looking specimens that the writer has ever seen in their natural habitat. From the highest boulder one can view part of the surrounding country even in the summer. Adding to the beauty of this spot is the mountain laurel which surrounds it, mingled with the oak-chestnut type of forest.

There are wild shrubs, ferns, mosses, lichens and such rare wild flowers as orchids. Due to the abundance of Juneberries, blackberries and wild cherries, the forest is a haven for birds, especially the native pheasant or ruffed grouse. Thus, for any type of nature lover the James White Municipal Forest has some interest.

For the tree planter it serves as a good example of successful spot planting. Complying with Forester Port's recommendations, the Borough planted 7,000 trees, comprising 3,500 Scotch pine and 3,500 Japanese larch on April 24, 1924. The State furnished the trees and the Boy Scouts planted them. The planting, of which the boys can well be proud, can best be related by giving you the exact words in the Borough Council's minutes of May 5, 1924. "As a matter of historic interest, it is here noted that the planting of the Municipal Forest was under the supervision of District Forester Harry E. Elliott, assisted by J. Higley Green, Ranger. The planting was done by the Coudersport Boy Scout Troop."

The only cost to the borough was for the lunches supplied the planters and the expense of surveying and marking the tract, which amounted to \$38.25.

A recent examination of the spot planting on both blocks showed that there was a considerable loss, especially to the Japanese larch, due to frost killing and possibly to the rocky condition of the soil and weed competition. At higher altitudes the larch made the best growth. It is hard to determine the exact percentage of establishment in spot plantings, but a fairly accurate figure was derived. The larch showed only 20 per cent establishment, 3½ ft. average height and 8½ ft. as the maximum height for 1930. The Scotch pine showed 70 per cent establishment, 4 1/3 ft. average height and a maximum height of 7½ ft. for 1931. Ultimately the trees will occupy the areas with the aid of natural reproduction. These trees show very little damage from weevil or rabbits.

Truly this forest merits attention and there is no reason why it cannot pay its way. The forest is capable of supplying at least 100 cords of stove wood annually, or more, over a short period if necessary. The people of Coudersport can obtain wood at a nominal sum with a short haul. The marking of such wood should be done by a forester. The revenue could be used to improve the rest of the forest in the following ways:

1. Eradicate what weevil there is in the pine.
2. Liberate suppressed pine and larch.
3. Brush out and reblaze the boundary lines.
4. Construct a trail or two to the boulder site.

5. Brush out the old road up the hollow to and through the forest.
6. Erect a sign along the Gordon Hollow road designating the James White Municipal Forest of Coudersport.

Boy Scouts under the supervision of a forester could help mark the trees and do the first two items as credit for merit-badge work in forestry. The rest of the work and maintenance of trails, boundary lines and signs could be done as the revenue allowed.

With this work accomplished, we will have something to be proud of, and as the years go by and the forest comes to maturity this memorial to James White will mean still more to the people of Coudersport.

RESPONSIBILITY FOR FOREST FIRE EXTINCTION

By George H. Wirt, Chief, Bureau of Forest Protection

THE duty of the State with respect to protection of property begins when one person's rights are encroached upon by another, or when the activities of an individual with respect to his own property do not accomplish what is believed to be necessary for the welfare of the community.

The United States Supreme Court declares: "It is recognized that the State as quasi-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere, the water, and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned." Also in the same opinion: "We are of the opinion further that the constitutional power of the State to insist that its natural advantages shall remain unimpaired by its citizens is not dependent upon any nice estimate of the extent of present use or speculation as to further needs."

Let us consider several examples. An individual owns a piece of forest property. Lightning strikes a tree on this property and causes a forest fire. Whose duty is it to extinguish this fire? It is evident that no human being has violated the rights of the forest owner. If the fire continues to spread, however, the owner loses to the extent of the value of the property destroyed by the fire; the local governmental units lose taxable value and consequent taxes; the State loses the effects of forest influences on its industrial con-

ditions, namely the need for an essential raw product and the labor afforded in its production, harvesting, manufacturing and transportation, the forest's influence on water, climate, health, and indirectly reduced taxes on reduced industrial activities resulting from a reduced natural resource.

If the fire spreads sufficiently adjoining property is endangered or actually destroyed, therefore the owner or owners of adjoining property become interested in order to prevent loss to themselves or to reduce their loss to a minimum.

In another case, the fire is started by a visitor to the woods, who, careless with his smoking material, casts a lighted match aside or drops a burning cigarette. He keeps on moving and does not know that his carelessness has started a fire. Whose duty is it to extinguish the fire? Is there any less responsibility upon the owner of the land to protect himself and his neighbor from loss? Is the neighboring owner any less concerned? There would seem to be no change in the status of these individuals. This fire, however, came from the action of a member of the community, the result of which act is an interference with the peace and rights of another member of the community and of the community itself. Is the local community or the Commonwealth any more concerned with the extinction of the fire? It is doubtful, although the duty of the community to protect itself and its members against the carelessness of its individuals is now called for.

In another case, an individual deliberately sets fire under conditions that it is evident he intends to start a conflagration. He has intentionally started the destruction of property not knowing or caring how far that destruction may go or whether life itself may be snuffed out as a result of his act. Does the fire burn any differently because it was set maliciously? Is the land owner any more or less interested in the protection of his property or that of his neighbor? Is his neighbor concerned any differently in such case? Is the local community or the Commonwealth under any more obligation to suppress the fire?

It is evident that there are several problems concerned. The first is with respect to the extinction of the fire itself. The second is with respect to the satisfaction of damages caused by the fire, and the third is the exercise of police power for the protection of the rights of individuals and the community.

It will be noticed that no matter how the fire starts, once it has started it will continue to burn until extinguished and the damage it does is

determined by the time it burns and by the extent of the area it burns over. It has been stated that the damage done is felt by the owner of the land, the local community and the Commonwealth. Therefore, these three factors are concerned in the extinction work in order to reduce to a minimum the damage suffered by each one. Likewise, the adjoining owner is concerned in each case in order to prevent damage to his property. Self interest should be the impelling force to move each one of these four factors concerned to prompt and vigorous action for the extinction of the fire both individually and in cooperation.

Further, unless there is cooperation the individual owner who endeavors to give his holdings complete protection from fire must give that same protection to a considerable body of land surrounding his holdings. He then is assuming a burden which is unjust to him and the surrounding owners are receiving a benefit at the expense of the public spirited citizen. No individual can afford to carry the expense necessary for this purpose, charge such expense against a young growing forest and expect to get a reasonable financial return from his forest investment. On the other hand, there are numerous examples which prove beyond a doubt that protected forests are the only kind that yield returns to all four factors heretofore mentioned. Where these four factors do what each one can and should do the burden is distributed; it is not great for any one and is proportional to the benefits received by each.

REFORESTATION DEFIES DEPRESSION

A SHIPMENT of 7,000,000 seedlings and replants from the four State nurseries indicates that the business depression is having little effect on reforestation. Although applications from mining, water and power companies have fallen off slightly, private land owners, principally farmers, are keeping the spring total up to a high figure. Municipalities are also among the leaders.

The cheering feature of this news is that the tree planters are looking beyond the present emergency. They are building for the future. While much of the present constructive activity in other lines must necessarily be of a character designed for temporary relief, the need for permanent planning must not be neglected. Preparedness for prosperity is evident in the Pennsylvania forestation movement.—*Philadelphia Inquirer*.

PROGRESS REPORT, ON PENNSYLVANIA PLANTATIONS

HAVING made a special study of 106 forest plantations in 18 counties of Pennsylvania, George S. Perry and C. A. Coover, of the State's forest-research institute, have stated their tentative conclusions from the study as follows:

In the State as a whole the worst obstacle to successful establishment of forest plantations has probably been rank-growing weeds, such as golden-rods, or dense and tall growing grasses, such as timothy. Because of competition from such weeds and grasses, the poorest results from forest planting are usually shown by the most fertile and moist portions of the areas planted. Where forest planting has failed from this cause, large transplant stock should be carefully set out in large holes after the sod or roots have been stripped from a space about 2 feet square at each fail spot. District Forester Shirey suggests that a square yard of strong building paper be fastened around each of the trees used in reinforcing such fail spots, stones or earth being used to hold the paper in position.

In northwestern Pennsylvania and near Gettysburg, in Adams County, where the soil is fine, newly planted trees have often suffered severely from frost heaving. Fall planting should never be attempted on such sites. In Erie County very good results have been obtained when the soil has been drained by plowing rather shallow furrows and trees have been set on the edge of the furrow.

Trees of several species, including northern white pine and Norway pine, have shown remarkable persistence when planted under brush and broken natural forest cover. District Forester Dague has demonstrated in Clearfield County that "while there is life there is hope" for Norway pine, so far as suppression by shade is concerned. Cutting to liberate plantings of Norway and northern white pines has been justified by results. In general, care and attention given plantations during their first five years has been well repaid.

No really successful plantings of ash or oak have been studied.

Shortleaf pine shows very good results where planted in southeastern Pennsylvania and as far north and west as Williamsport.

Japanese black pine is apparently not suitable for forest planting in Pennsylvania. Japanese red pine grows thriftily but is almost universally multiple stemmed. Those few trees that have a

single stem show excellent growth. It is hoped that with superfluous boles pruned away in early life the tree will prove to be a good grower and well adapted to the soils and climate of Pennsylvania.

Except where naturally propagated trees or brush are present, spacing wider than 6 feet does not seem advisable for any tree. Northern white pine, especially, requires close spacing for good growth. All the best plantings of this tree were spaced 4 by 4 feet; the least successful one was spaced 10 by 10 feet.

White pine weevil is the worst insect pest afflicting planted forests in Pennsylvania. It seems to do much less damage in close-spaced than in wide-spaced plantings. It sometimes attacks Norway spruce as severely as northern white pine and in some places does serious injury to Scotch, Japanese red, jack, and even shortleaf pine. This insect, except in one or two plantings, appears to be far less prevalent in 1931 than in 1928 and 1929. Sawfly larvae have done considerable damage to the larches and hard pines. They seem to do greater injury at higher elevations and in portions of the State having a moist, cool climate. A planting of jack pine along the Frankstown Road near the summit of the Allegheny Mountains was wiped out by sawfly attacks.

The best-growing tree found was a European larch in a mixture of that species with northern white pine at Lucullus, Lycoming County. Planted in 1912, it is now 46 feet tall and 8.2 inches in diameter at breast height. The greatest height growth found to have been made in a single year was that of a northern white pine in the York Water Co. plantations near Jacobus, York County, which grew 5.4 feet during the 1928 growing season.

Messrs. Perry and Coover point out that these preliminary deductions are subject to revision in the light of further study of their data.

RECREATIONAL USE OF NATIONAL FORESTS GROWS

Forest Service Reports 32 Million Visitors; More Camping, Hiking and Picnicking

RECREATIONAL use of the National Forests in 1931 increased as compared with 1930, reports just compiled by the Forest Service show. The estimated total of visitors for 1931 reached the record figure of 32,228,613, a gain of 324,098 over the preceding year, the U. S. Department of Agriculture announced.

More intensive recreational use was indicated by gains in numbers of resort and hotel guests, campers, picnickers and special-use permittees. The 1931 total of visitors included 496,566 special-use permittees and guests, 1,618,460 hotel and resort guests, 2,193,866 campers, and 3,765,025 picnickers.

The increased numbers of those camping and making picnic trips to the National Forests more than offset a decrease in the number of transient tourists from 24,993,591 in 1930 to 24,154,696 in 1931. Of the total number of visitors, those traveling to the forests by automobile numbered 29,836,412, a net gain of 284,805 as compared with 1930. Railroad and trolley passengers to the forests about held their own, with 1,925,237 using these modes of travel. Hikers increased more than 10 per cent, with 248,970 in 1931 against 220,853 coming in afoot the year before.

California led all States last year in National Forest recreational use. The nineteen National Forests in California had 17,454,748 visitors, a gain of more than a half million for the year. National Forests in Arizona had 2,818,534 visitors; those in Colorado, 2,265,071; Oregon, 1,651,573; New Hampshire, 1,563,777; Washington, 1,407,354; Montana, 1,050,243; New Mexico, 1,033,933.

SEEDING HABIT OF PITCH PINE*

By A. C. McIntyre**

A VERY interesting habit of pitch pine (*Pinus rigida* Miller) is its retention of cones for a great many years some of which remain closed retaining their seed.

Old cones adhering to the branches of this tree give it a characteristic appearance. Only three other eastern conifers exhibit this serotinous habit; Table Mountain pine (*Pinus punguens* L.), Jack pine (*Pinus banksiana* L.), and Pond Pine (*Pinus rigida* var *serotina* M.).

The remarkable habit of cone and seed retention is of use in the struggle for existence. It is a well known fact that pine seeds, as a rule, are very perishable and it is important to test by actual experiment to what extent seeds retain their viability while thus stored in the cones. The conditions that exist in these serotinous cones are almost ideal for the preservation of the vitality

*Contribution from the Department of Forestry, The Pennsylvania State College. Publication authorized by the Director of the Pennsylvania Agricultural Experiment Station as Technical Paper No. 556.

**Instructor in Forest Research.

of the seeds. While some exchange of gases is allowed, the spores of fungi and bacteria are effectively excluded, and, most important of all, a sufficient humidity is maintained to prevent a fatal desiccation. That this humidity is due to contact with the moist wood of the live tree is shown by the mechanical opening of the cone through drying when removed from the branch or when the tree dies. This opening is, however, not always prompt or complete.

The cones of pitch pine sometimes partially open while on the tree, especially those on the sunny side of the tree. A temperature in excess of 80 degrees F., is sufficient to cause the cones to partially open and liberate some of the seed. Investigations have shown that seeds are not born on every cone scale and that very often only one seed develops to a scale. Cones are born in all parts of the outer crown; but are the seed as viable in cones found in the tip of the tree as those growing near the base of the tree crown? To answer this question a study was made of 60 pitch pine cones taken from an open crown tree, 91 years old, 80 feet tall, 20 inches in diameter at breast height, and the crown of which was approximately 60 feet long with a spread of about 30 feet. The crown was dense and the tree appeared very healthy.

Twenty cones were secured from each of the three portions of the crown; top, middle, and base, and five cones for each of the years 1925-26-27 and -28. All cones came from the southeastern side of the crown. The cones were brought into the laboratory, their stalks cut off flush with the cone base and each cone was weighed. The heaviest cone weighed 14 grams and the lightest 7.55 grams, the average for all cones being 10.25 grams. The maximum length was 6.1 cm. and the shortest cone was 3.5 cm., and the average of all cones 5.19 cm.

The scales of each cone were counted with the spiral and the cone was divided into three equal parts based on number of scales. In this work it was interesting to note that the cone scales spiraled both clock-wise and counter-clock-wise. The number of scales varied only slightly, the limits being from 18 to 21 scales to a spiral. Scales increased in size from the base of the cone to the middle and then decreased in size to the top of the cone. The scales from each third of the cone were removed separately and data as to number of seeds produced tabulated.

Rudimentary wings were found between the second and fifth rows of scales but in no instance was a developed seed found in the lower third of the cone. Viable seed were found from the mid-

dle portion of the cone to the third and second rows of scales from the tip of the cone. No correlation seemed to exist between size of cone scale and size or viability of seeds. The small scales near the tip of the cone produced just as large seed as did the largest scales found in the middle portion of the cone.

Two cones were slightly curved and no seed were found on the compressed side of the cone though seed wings did occur. The knife test was used in determining seed viability and only those seed having well developed cotyledons were considered viable. It was observed that seed having reddish-brown streaks or large, brown spots at the broad end or those that were a very light tan color were sterile. Viable seed were invariably black, rough coated, longer than wide, and well filled out.

The results of this study are presented in Tables I and II. There is strikingly little variation in the data. The cones from the base of the tree were slightly larger and heavier. The cones from the top of the crown had the greatest number of cone scales and seeds. The greatest number of viable seed were found in the cones collected from the middle portion of the tree crown. It should be kept in mind in comparing these figures with other figures on seed viability that in this study all seeds were counted that showed a developed seed coat whether or not cotyledons were present. Figures quoted on viability of seed purchased are based on seed that have been cleaned in which undeveloped seeds, being light, are readily separated by winnowing. Table II shows that the greatest number of viable seed are found in the middle portion of the cone. More seed are born two to the cone scale and a greater percentage of these seeds are viable than where only one seed is born to the scale.

It was concluded: There is no relation between the size and weight of pitch pine cones and the number of rows of scales.

The size of cone scales does not influence the number or viability of seeds produced.

More seed are born in pairs than singly.

Seed born double are more viable than those born individually.

The lower third of pitch pine cones produce no seed.

More viable seed are found in the middle third of the cones than in the upper third.

The greatest number of viable seed are produced in cones found in the middle portion of the crown.

TABLE I

Data showing the average relationship between Pitch pine cones collected from different parts of the crown, their size, number of cone scales and number of seed. Data based on analysis of 20 cones from each of the three parts of the tree crown. Pennsylvania, 1930.

	Position in Crown from Which Cones were Collected			
	Top	Middle	Base	Total
Average weight of cones, grams.....	10.22	10.20	10.39	10.27
Average length of cones, cms.....	5.15	5.09	5.25	5.16
Average total number of cone scales.....	132.20	130.45	125.50	129.39
Average total number of seed in cones*.....	38.60	37.70	38.05	38.12
Middle third of cone	No. of scales bearing no seed.....	21.55	17.60	21.75
	No. of scales bearing 1 seed.....	9.10	9.60	8.50
	No. of scales bearing 2 seeds.....	11.50	11.50	8.55
Top third of cone	No. of scales bearing no seed.....	7.65	6.85	9.20
	No. of scales bearing 1 seed.....	6.20	6.65	8.70
	No. of scales bearing 2 seeds.....	11.80	9.95	12.30
Total number of cone scales bearing no seed.....	93.60	92.75	87.45	91.27
Total number of cone scales bearing 1 seed.....	15.30	16.25	17.20	16.25
Total number of cone scales bearing 2 seeds.....	23.30	21.45	20.85	21.87
Relation of number of potential seed to the number of cone scales	29.19%	28.89%	30.31%	29.46%

* Seed as used means both viable and undeveloped.
Basis number of cones examined, 60.
No seed found in lower third of cone.

TABLE II

Average data showing the relationship between total number of seed produced in middle and top third of cone* and the cones' position in the tree to their viability.

No. of seed Born on a Scale		Position of crown from which cones were collected				
		Top	Middle	Base	Total	
Middle third of cone	1	Average number of seeds per cone.....	9.10	9.60	8.50	9.07
		Average number of seeds per cone viable.....	1.10	2.20	1.95	1.75
		Per cent viable	12.08	22.91	22.94	19.29
	2	Average number of seeds per cone.....	11.50	11.50	8.55	10.52
		Average number of seeds per cone viable.....	2.65	3.85	2.85	3.12
		Per cent viable	23.04	33.47	33.33	29.65
Per cent viable for average cone.....		18.20	28.67	28.15	24.85	
Top third of cone	1	Average number of seeds per cone.....	6.20	6.65	8.70	7.18
		Average number of seeds per cone viable.....	.45	1.35	1.80	1.20
		Per cent viable.....	7.25	20.30	20.68	16.71
	2	Average number of seeds per cone.....	11.80	9.95	12.30	11.35
		Average number of seeds per cone viable.....	2.90	3.00	3.10	3.00
		Per cent viable.....	24.57	30.15	25.20	26.43
Per cent viable for average cone.....		18.61	26.20	23.33	22.66	
Average number of seed per cone born 1 to the cone scale.....		15.30	16.25	17.20	16.25	
Average number of viable seed per cone born 1 to the scale.....		1.55	3.55	3.75	2.95	
Per cent of total number born 1 to the scale.....		10.13	21.84	21.80	18.15	
Average number of seed per cone born 2 to cone scale.....		23.30	21.45	20.85	21.87	
Average number of viable seed per cone born 2 to scale.....		5.55	6.85	5.95	6.12	
Per cent of total number born 2 to the scale.....		23.81	31.93	28.53	27.98	
Average total number of seed per cone.....		38.60	37.70	38.05	38.12	
Average total number of viable seed per cone.....		7.10	10.40	9.70	9.04	
Per cent of total number of seed per cone viable.....		18.39	27.58	25.49	23.71	

* No seed born in lower third of cone.

LARGEST TREE IN THE WORLD

THE U. S. Forest Products Laboratory, Madison, Wis., has been trying to find out where the largest tree in the world is located. Contrary to general belief, it does not appear as though the redwood carries off the prize as the tallest tree, but up to this time it belongs to the Douglas fir. The tallest known redwood is one that is still standing and reliable measurements place its height between 359 and 368 feet. A felled Douglas fir that measured 380 feet by a steel tape was reported in 1900. Another reported from Vancouver, British Columbia fifteen or twenty years ago is alleged to have been 417 feet high with a stump diameter of 25 feet. The diameter is substantiated by a photograph but the height figure has not been definitely established. If correct, it is by far the tallest tree on record. The tallest Eucalyptus of authentic measurement was 346 feet high.

In diameter the redwoods as a class head the list with size, running up to 30 feet in diameter. There is an individual cypress in Mexico that has a diameter of 40 feet at the ground and at five feet above is 35 feet across. The largest living Kauri tree, a native of New Zealand, measures 24 feet across. So far as known, the largest lumber tree in the world was a redwood recently found in Humboldt County, California, that scaled 361,366 board feet. A Kauri tree scaled 220,000 board feet. These trees are somewhat barrel shaped with practically no taper.

Leaves of books are so named because actual leaves were used for writing before paper was invented. The word "book" comes from the German name for beech on which Teutons first wrote.

Georgia has the largest timbered area of any State in the Union according to State Forester B. M. Lufburrow. The present commercial forest area is 22,872,000 acres of which 1,150,000 acres are old timber, 20,143,000 acres of second growth, and 1,579,000 acres is forest land which is not producing valuable trees.

Six hundred and sixty-four thousand sugar maple trees were tapped in Pennsylvania in 1932 from which were produced 142,000 pounds of maple sugar and 164,000 gallons of syrup. The total production in terms of maple sugar was 1,454,000 pounds or an average of 2.19 pounds per tree. This is about 71½% of the production in 1931.

A recent decision of the Franklin County (Penna.) Court establishes for the first time the authority of the Commonwealth to compel land owners to clean up sources of danger in plant pest control work, states R. H. Bell, Director, Bureau of Plant Industry, Pennsylvania Department of Agriculture. The Pennsylvania Plant Pest Act of 1927 gives the Secretary of Agriculture authority to destroy plants and other agriculture products if in his opinion, such action is necessary to safeguard important agricultural interests.

The Franklin County case involved the removal of cedar trees on properties of 22 individuals as the only control for Cedar Apple Rust which was causing important loss in commercial apple orchards in the vicinity. Four of the property owners refusing to remove the cedar trees from their land, were prosecuted, adjudged guilty of a violation of the Act and fined by a justice of the peace. In the meantime, the trees were removed by the State. An appeal was carried to the county court based on the constitutionality of the Act, the plea being that a cedar tree was not a plant as defined in the Act and that citizens could not be deprived of property without due process of law. The court sustained the decision of the justice of the peace and upheld the Act on both points of the defendants' plea.—(Extract from *The National Nurseryman*, February 15, 1932.)

District Forester Charles Zerby, of the Kittanning Forest District, reports an interesting account of a walnut tree 204 years old, which was recently removed from the yard in the rear of the residence of Mr. H. D. Hulin, Franklin, Pa. The tree died and became a menace to the building and it was, therefore, necessary to have it removed. The tree was 128 feet in height and 4 feet, 6 inches in diameter. The roots excavated to a depth of 10 to 15 feet under ground and although the tree was dead, the wood was sound and was purchased by a lumberman of Cleveland, Ohio. Years ago the tree produced bushels of walnuts but it died about five years ago. The death of the tree is attributed to an earth fill made at the time the residence was completed.

We import today 85 per cent of our lumber needs, 80 per cent of our pulpwood, 76 per cent of our mine timbers, and 55 per cent of our railroad ties. The average freight haul of imported lumber is 1200 miles; for pulpwood 700 miles; for railroad ties 800 miles; and for mine material 900 miles.

Jat

FOREST LEAVES

OCTOBER, 1932



PUBLISHED BY THE
PENNSYLVANIA FORESTRY ASSOCIATION
PHILADELPHIA, PA.

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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 306 Commercial Trust Building, Philadelphia.

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Whole Number 267

FRANK LINCOLN BITLER

A LIFE of unusually long and active service in the cause of forestry in Pennsylvania, and of effective contribution to the work of this Association, was terminated on September 9th. Though forestry was not his profession, he made it an avocation when a young man, and earnestly labored with the early founders and workers in the movement to reforest the denuded lands of the Commonwealth for the benefit of its citizens. To this work he brought the willingness and thoroughness which characterized his enterprises and it was typical of his character that he labored so earnestly and so modestly for others. Although in failing health for the past two years, his interest never flagged, and up to a few days of his death he maintained correspondence regarding material for this issue.

Beginning as an assistant and associate, he later by request prepared and edited FOREST LEAVES for many years, organized and managed a number of the Annual and Summer Meetings, and served long and capably as Secretary and Treasurer. During his exceptionally long period of activities he was always helpful and dependable.

This Association and all those interested in forestry in Pennsylvania and elsewhere are greatly indebted to him for the work he has done. And those who knew him will remember a gentle and kindly nature who helped by deeds. He was truly a friend of forestry.

At a meeting of the Council held on October 10th the following resolution was adopted:

WHEREAS, The Council of The Pennsylvania Forestry Association is deeply sensible of the personal loss to us and the deprivation to our Association by the decease of Frank L. Bitler, and

WHEREAS, Mr. Bitler was for many years a competent and earnest Secretary and Treasurer and Editor, faithfully and fully performing these duties, and in many other ways contributing to the work and activities of this Association, and

WHEREAS, The Pennsylvania Forestry Associ-

ation and the cause of forestry are greatly indebted for his many and useful activities on their behalf; now, therefore, be it

Resolved, That the Council, on behalf of The Pennsylvania Forestry Association desires to express and record their high appreciation of his long and valuable services, and of his kindly and unselfish personality, and be it further

Resolved, That a copy of this resolution be spread upon our records, that the same be printed as a memorial in our publication, and that a copy be sent his family as a token of our appreciation and our sympathy.

EDITORIAL

WE are glad to include in this issue Mr. May's clear exposition of the destructive White Pine Blister Rust and his lucid description of how this disease passes through five different stages and is transmitted, not from tree to tree, but from tree to a member of the *Ribes*, or currant family, possibly miles away, and thence to another bush of *Ribes* which may be a half mile distant, and from this to another White Pine. The long period of incubation of the spores in the final stage results in trees being fatally infected long before the owner realizes that the stand is doomed.

Because of the desirability of white pine as a commercial wood Federal and State departments are cooperating with owners to combat this menace. Fortunately the cost of exterminating the "carriers" is low, and we commend to our readers perusal of the article and where possible their cooperation in eradication measures.

* * * *

Owing to changes in office arrangements, the room of this Association was moved, by mutual consent, to 306 Commercial Trust Building, Philadelphia. This contains a large number of books on forestry and allied subjects, and we desire that it shall be of use to members. It has been possible to arrange for someone to be in the room much of the time—at other times the key may be ob-

tained from the Secretary's personal office, which is in the same building. Not only you but your friends who are interested in forestry are welcome to use this room for reading.

* * * *

Our fellow member, Dr. E. E. Wildman, Director of Science for the Philadelphia Board of Education, has aroused much interest by his idea of searching out trees in this region which were growing when William Penn landed two hundred and fifty years ago. By permission we reproduce his article together with a small list of some of the larger trees, for the total list has at this writing reached the figure of 200.

Aside from the special features in this matter, there is no question but that every such enterprise interests more people in trees, and we should be glad to know of projects in other regions which stimulate this.

* * * *

The purpose of this magazine is to stimulate and maintain interest in forestry in Pennsylvania. Our readers include people of varying ages, interests and occupations. Those who specialize in the study and practice of forestry wish to be informed of new investigations and facts; others are interested in more general aspects of the movement.

We wish the magazine to interest our members. It should also interest other readers, for it is one means by which our purposes become known and by which the cause is advanced. We shall welcome your views and suggestions on this subject, asking you to remember that our choice is limited to articles donated or copied by permission.

* * * *

We are pleased to include in this issue the Fall Arbor and Bird Day Proclamation of the Governor, which merits reading and consideration of the salient facts therein.

This recalls that on the Spring Arbor Day, exercises were held at Media as a part of a foresting program by the school children of Media. Our cover reproduces a photograph of some of those who cooperated, and we are including an article on this establishment of 11,000 trees, which was originated and fostered by our President, Mr. Samuel L. Smedley.

It now requires but little vision to realize that what was formerly a bare tract will develop into an area covered with evergreens, and as the trees grow, wild flowers and animals will find in it a home and a sanctuary, less erosion will occur and the people of Media will enjoy the advantages.

Ours is a large country, and its many people need the products and the benefits of many thousands of millions of trees. The President of this Association has demonstrated at Media that the people of a community can be interested in converting barren land into an asset which will combine utility and recreation. Many similar opportunities exist and we shall be glad to learn of them.

FALL ARBOR AND BIRD DAY PROCLAMATION

I, GIFFORD PINCHOT, Governor of Pennsylvania, do hereby designate and proclaim Friday, October 21, as Fall Arbor and Bird Day to be appropriately celebrated by citizens and pupils generally throughout the Commonwealth.

I am gratified that Pennsylvanians have so actively participated in the George Washington Bicentennial tree planting as part of the celebration which opened on February 22, our first President's birthday, and which closes on Thanksgiving Day, November 24. Nearly four million trees already have been planted in Pennsylvania and dedicated to the memory of Washington.

Birds are the natural guardians of our field and forest crops. It is not sufficient to protect birds from slaughter; they should be encouraged to make their homes within our borders. Shelter boxes and food are man's tokens of friendship and hospitality.

There are many kinds of trees native to our State that are important sources of food for birds, and in addition provide shade and improve the appearance of our streets, highways, parks, and homes. Because of their ornamental qualities and value as producers of bird food, I recommend extensive planting throughout the Commonwealth of elms, birches, maples, cherries, mulberry, dogwood, mountain ash, junipers, and cone-bearing trees such as the pines, hemlocks and spruces.

And I further recommend that the trees planted this Fall Arbor and Bird Day be dedicated to the Father of Our Country.

GIVEN under my hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this twentieth day of September, in the year of our Lord nineteen hundred and thirty-two, and of the Commonwealth the one hundred and fifty-seventh.

By the Governor:

(Signed) GIFFORD PINCHOT.

(Signed) RICHARD J. BEAMISH,
Secretary of the Commonwealth.

1932 SUMMER MEETING

THIS year's Summer Meeting was held at Doylestown and vicinity on June 23rd and 24th. On the morning of the first day inspection was made of the historical museum in Doylestown, after which the members and guests met for luncheon at the Fountain House. In the afternoon members of the famous Doylestown Nature Club were our guides and companions in a visit to the well known Tile House, built by a member, now deceased, Dr. Henry Mercer. From here we were taken through the arboretum and bird sanctuary, which also offered opportunity to visit the tile factory.

Our afternoon terminated at the home of our member, Mr. William Mercer, where Mrs. Mercer made all welcome, and by the combination of her friendliness, her other guests and excellent refreshments we stayed until we were "overdue" for our next engagement. During this visit we accepted our hostesses' invitation to stroll around the beautiful grounds which include many fine trees, one being an unusually rare Japanese specimen.

Dinner brought us all together again after which a meeting was held in the High School Auditorium, to which residents were invited.

President Smedley requested Hon. George Hotchkiss, Burgess, to act as Honorary Chairman, and asked him to speak to the members. Mr. Hotchkiss gave a cordial welcome to Doylestown and its many attractions. He gracefully expressed his appreciation of our visit to Doylestown and spoke of the citizens' interest in trees and in forestry. Especial mention was made of their interest in the many old trees which have been preserved and to the justly earned reputation of the Doylestown Nature Club and its successful work for many years. He welcomed those who brought new ideas to the community and affirmed his appreciation of our work. Mr. Hotchkiss expressed the hospitable nature of Doylestown, which had been shown us that day and was to be further demonstrated the next day.

Mr. Smedley replied to the welcome, and his remarks are given in this issue.

The next speaker was Dr. Cameron Ross, Superintendent of Schools. He referred to the frieze on the walls of the room, which had been made by the late Dr. Henry Mercer, who was devoted to nature. This frieze represented a history of Doylestown. Dr. Ross said that as a teacher he was in sympathy with our work, because he realized the importance of conserving our natural resources, especially the forests. He remarked that State and

Federal governments do not receive their share of credit for their activities along these lines, and referred to the telling facts given by a recent publication on Conservation, edited by Dr. Ray Lyman Wilbur, and published by the Federal government. Visits to much of Pennsylvania had given him an appreciation of the beauties of the State and sympathy with every effort to maintain beauty and scenery and wild life. As a teacher he realizes that the future is obtained by sowing the right seed in the minds of children, and that by teaching them the right ideas and knowledge we shall build a better citizenry and nation.

Doylestown has been termed "A town on the Hill," but it is also "on the level." As a Doylestown he was pleased to recall that the Doylestown Nature Club and its work had been founded by Mrs. James (an active member of this Association).

Present education has less of literature and more of science and physical training and languages to better fit the students to meet and appreciate life. The teachings emphasize economic phases of nature, and also its aesthetic side. He believes schools can help by developing a love for nature, which is beautiful and inspiring, and will result in a respect for growing things and for public and private property, a desire to save rather than to carelessly injure or destroy, and an appreciation of the economic phases of our natural resources.

Dr. Ross believes there should be an organized campaign all over the State to preserve the beauty of our roadsides. Conveniences can be regulated as is done in some states. He referred to the fact that their local newspaper had for years campaigned against the bill-board nuisance, some of which are menaces to the driving public. He referred to the debris scattered along roadsides by motorists, and held that roadside stands should be regulated. We must set an example to youth by preventing spoilage by roadside structures.

He concluded by stating that we are living in an age of more leisure. Hence we must find ways for the people to enjoy the increased leisure, and we should educate our people to appreciate nature.

The President then asked for remarks from Mr. John W. Keller, Deputy Secretary of the Department of Forests and Waters. Mr. Keller said that he had been particularly interested in the Burgess' talk, and that when Dr. Ross had spoken of the highways he had struck a responsive chord. He also expressed his pleasure at being present and wished that more people could come and get inspiration.

He had found forestry work more than inter-

esting, because the future of the country depends so much on our forest situation and the amelioration of the conditions which have resulted from the destruction of forests. Regarding the effect of barren lands he mentioned that the forests adjoining the Sahara desert are receding three miles each year because of the effect of the contiguous area; that the population of Tripoli had dropped from 46 to 4 million after the conquerors had destroyed the trees; and referred to the desolation and difficulty of subsistence in such treeless regions as the Gobi Desert, and in Syria and China. Recent studies by Dr. Cook, sent to a region in South America by the Carnegie Institute had led Dr. Cook, after much study to conclude that an agricultural population had cleared more land of forests to obtain greater grazing areas to accommodate increasing population. Then the rains washed the land from the bare hills into the lakes, resulting in mosquitoes, consequent malaria and an enforced depopulation and emigration, and few remain where a large population was once supported.

Mr. Keller referred to areas in this State where what were once forests are now sterile worthless land, and asked: Shall or shall not this continue?

He closed by stating that the Department of Forests and Waters desires closer cooperation with the Pennsylvania Forestry Association, because they appreciate the assistance given over many years.

Following this, Mr. E. F. Brouse, District Forester, gave "Some Aspects of Forestry in South-eastern Pennsylvania," which is published in this issue.

The concluding address, by Mr. Edwin A. Ziegler of the Forest Research Institute of the Department of Forests and Waters related to "A Basic Problem in Private Forest Ownership—the Size of the Tax Bill," will be in our next issue.

The following day members and friends motored to Washington Crossing and viewed the plantings in the State parks, both on the Pennsylvania and New Jersey sides. En route a stop was made at Bauman's Hill, where from the recently completed tower, placed on the site of the Continental Army look-out, a view was had over the immediate Delaware River Valley.

An interesting feature of the New Jersey planting was that here were set out specimens of all the trees native to that State—a gift from Mr. Charles Lathrop Pack, President of the American Tree Association, and his son, Mr. Arthur Newton Pack.

Sixty lunched together at the Washington Crossing Inn, and at its conclusion the following resolutions were presented and passed:

WHEREAS, The State of Pennsylvania now owns and controls 1,500,000 acres of forest lands, which it has thus far not been able to properly develop by reason of lack of funds, and

WHEREAS, The Legislature in Special Session is about to appropriate funds to relieve the unemployment situation, and

WHEREAS, The work to be done in improving the value of these forest lands and protecting them from fire loss requires actual manual labor and hence gives a maximum employment for money expended, and

WHEREAS, The Department of Forests and Waters has a comprehensive program worked out in detail for the improvement and fire protection of the forest lands by the direct use of labor, and this program can be put in operation as soon as funds are available; now therefore be it

Resolved, That the Legislature be urged to include in their program for this emergency a substantial sum to be appropriated for this purpose, and also

Resolved, That a copy of this resolution be sent to the Governor and to the members of the Legislature.

WHEREAS, A previously recommended Forest Bond issue was passed by two sessions of the Legislature and was also favorably voted upon by more than 400,000 citizens of the State, and

WHEREAS, Forest lands acquired by the State are a capital asset, and hence should properly be purchased by the proceeds of bonds rather than out of current income, and

WHEREAS, Large areas of land are available and their utilization for forestry purposes will give actual employment to many individuals, and

WHEREAS, Conditions have made this an unusually favorable time for the purchase of land at inviting prices, and

WHEREAS, A Forest Bond Issue can be legalized and made effective within two years if passed by the Legislature at this Special Session, now therefore be it

Resolved, That the Legislature be requested to pass the necessary legislation to enable the State to issue bonds to the amount of \$15,000,000 for the purchase and proper development of forest lands by modern methods of silviculture, and

Resolved, That a copy of this resolution be sent to the Governor and the members of the Legislature.

A delightful and stimulating address closed the luncheon. Col. Henry D. Paxson, an historian

of note and a member of the Washington Crossing Park Commission, spoke informally and with effectiveness on the story of the famous crossing of the Delaware. His remarks were rich in historical facts related to the vicinity, and the story of the handicaps under which the army of General Washington had maintained their position, the execution of the plan for the surprise attack "on a night not fit for a man or a dog to be out," were related in a manner that not only held the audience, but inspired them. The sustained applause which followed was a sincere expression of appreciation for a very splendid address.

The delegation then assembled at a location in the park, where a hemlock, the State Tree, was planted, the officers and members contributing to the work. This tree, so placed by courtesy of the Park Commission, was planted as a memorial to the 1932 Summer Meeting of the Pennsylvania Forestry Association, which was so noted on a bronze marker, the tree and the marker both being donated by one of our members.

Returning, a stop was made, by invitation, at Col. Paxson's home at Holicong, where he displayed and discussed his unusually complete collection of early American farm and household tools and equipment. Thence we went to the home of Mr. David Burpee and his mother, Mrs. W. Atlee Burpee, where we were all kindly welcomed and enjoyed a delicious tea, as the guests of these good people, and Mrs. Irwin M. James. Sitting in a delightful spot and being well cared for and entertained, we rather prolonged our stay, but it was a pleasant finale to our session. We had the courtesies and help of a great many people, and perhaps our feelings could best be expressed by stating that we had full proof of Doylestown hospitality.

PRESIDENTIAL ADDRESS

By Samuel L. Smedley

FOR the information of those who are not familiar with the history of the Pennsylvania Forestry Association and its activities, I would say that it is near a half century since Dr. Joseph T. Rothrock, a man of unusual foresight and vision, began to call attention to the rapid destruction of our forests and the disastrous conditions which future generations would have to face if provisions were not made to restore them. He succeeded in interesting a number of men and women who, in like manner, sensed the condition towards which our country was tending as to her forests.

In 1886, they organized our Association which was largely responsible for the existence of our now very comprehensive State Department of Forests and Waters. Dr. Rothrock was the first person called upon to organize the Department.

It soon became evident that, if this Department was to properly function, it would be necessary to have trained foresters, so a school of forestry was established at Mt. Alto. Naturally, it was necessary for the State to acquire extensive land holdings, and much of it was among the mountains. Dr. Rothrock became imbued with the idea that some of these higher elevations offered opportunities for health resorts, particularly for those afflicted with tuberculosis, so, through his foresight and support of this association, the Mt. Alto Sanitarium was established where thousands of our citizens have been greatly benefited by proper medical attention under such favorable surroundings.

At the present time, we are stressing the importance of forestry and conservation in our public and private schools, being fully aware that if any important steps are taken to enrich the lives of our citizens, it must be started and affiliated with our system of education. In this connection, I am happy to call your attention to the fact that there is being installed a course of studies throughout the public schools of this State by which the children, starting with the kindergarten and continuing all through the elementary, junior high, and senior high school studies, are being taught the necessity of preserving wild life, as well as the appreciation of its beauty. This group constitutes the voters of tomorrow. This valuable addition to the school curriculum has been largely accomplished by the untiring effort of a member of our council, Dr. Edward E. Wildman.

It has been our custom for many years to hold summer meetings at various points over the State. It is quite natural we should not overlook Bucks County with her wealth of natural resources, historic landmarks, Indian lore, palisades and Ringing Rocks, as well as her forestry interests. So we are here to enjoy our hospitality and to spread the gospel of forestry being ever in mind of our slogan "Restore Penn's Woods."

Bucks County, with her many miles of beautiful river front and numerous stream valleys leading down to the historic Delaware River, together with the fact that a large portion of this river front has been taken over by our State for permanent public recreation grounds, insures a future to be envied by many of our sister counties.

At the present time, it seems almost an impossible task for the State to properly care for these valuable acquisitions, but it is just such a condition that will awaken public sentiment to the importance of restoring the historic and scenic sections of our State for the use and enjoyment of our citizens.

Pennsylvania has wonderful possibilities and I am loath to say it, but as I see it, we are 50 years behind New York and 25 years behind New Jersey in providing recreational facilities. Our neighbor to the north seems to be able to furnish almost unlimited means for forestry and recreational purposes, while Pennsylvania, with all her forestry traditions dating back long before the founding of our commonwealth, has to struggle along with scarcely sufficient funds to keep the department properly organized.

Strenuous efforts were made during the last regular session of our legislature for an appropriation of \$150,000 for the promotion of State parks in Pennsylvania, with the result that only \$50,000 was set aside. As you are aware, West Chester County, N. Y., was compelled by the foul conditions of stream valleys which had become a menace to the public health, to spend vast sums to restore living conditions, with the result that for every dollar spent, an increase of \$12.00 in assessed valuations was effected.

From a forestry standpoint, we can rejoice in the fact that a greater number of trees have been planted throughout our country this year than ever before. This has largely been brought about by the American Tree Association who inaugurated a movement last year to plant 10,000,000 trees as a living memorial to George Washington on the occasion of the 200th anniversary of his birth. To date there has been reported 18,000,000 trees planted. This has not been confined to this country alone, many others having been planted throughout the world. Berks County seems to be on the lead in our State with 2,000,000 to her credit. This planting not only adds to the timber stand of our country, but acts as an educational and inspirational interest to the present and future generations.

The Borough Council of Media, Delaware County, was induced to apply to the State for trees to be planted on a 25 acre tract adjacent to her water supply. By the assistance of boy scouts, school children, and interested citizens, 11,000 trees were planted and on April 22nd, this planting, with appropriate exercises, was dedicated as part of the George Washington memorial planting. It was most gratifying to see the interest the boy

scouts and school children manifested in this work. Later, some of these boys were taken to see a planting of 25 years' standing that they could visualize what their efforts might some day be like.

At the present time our Forestry Council are exerting every reasonable effort possible. Public funds should be available for relief work to direct as much as can be towards the establishment of labor camps in our State forests. This has been done in other places with satisfactory results, and there is no reason why it cannot be done in Pennsylvania. In this way, money so expended serves a dual purpose. It not only furnishes relief for the unemployed, but, at the same time, our State forests are receiving needed attention.

The Association feels that in Mr. E. F. Brouse, Southeastern Pennsylvania has a very able representative of the Department of Forests and Waters to look after her interests. This is evidenced by the additional number of persons who, each year, become interested in the planting and care of trees.

In closing, I wish to express to the citizens of Bucks County our willingness to cooperate with them in the preservation of her natural resources, believing that a proper distribution of forest areas among your various attractive locations will tend to conditions that will promote the best interests of our citizens.

SOME ASPECTS OF FORESTRY IN THE VALLEY FORGE DISTRICT

By E. F. Brouse

THE Valley Forge Forest District is comprised of the eight counties in the southeastern part of the State. It extends from the Delaware River on the east to the Susquehanna on the west, is bounded on the north by the Blue Mountains and the Lehigh River and on the south by the State line. It is a large territory and in it are 483,000 acres of timberland. On the whole this forest land is somewhat scattered but there are blocks of considerable size in southern Berks, northern Chester, southern Lancaster and in northern Bucks Counties. They do not in any way compare to the wild land in central and northern Pennsylvania, nevertheless it is interesting to know that there are nearly 500,000 acres of woodland in this area which supports approximately one-third of the State's population, and which generally is thought to be largely agricultural land in a high state of cultivation. The forest land in

this section is privately owned except the State Game Lands, numbering four tracts. The Department of Forests and Waters has made attempts in several localities to acquire land for State Forest purposes, however, the chance is remote that we will be able to meet our requirements, for the areas are scattered and small. Whether this will be possible in the future is questionable.

In view of the fact that the Department owns no land, forestry work in the southeastern part of the State is largely of a cooperative nature with the private land owner. We offer service in the way of supplying the supervision and leadership but the most important role, that of actually financing the work, is assumed by the landowner. There is, of course, a notable exception to this in the light of the Department's activities in the prevention and control of forest fires. The Department exercises complete control over this phase of the work and also bears the burden of the costs.

Forest Protection.—It is fitting to first consider the problem of forest protection. This is the most important phase of the work in this District as it is elsewhere in the State. Without protection forestry is impossible. This work is undoubtedly the most difficult, disagreeable, and in a way the most unpopular form of our work, for hordes of our people avoid and ignore it. Certainly there are individuals, associations and clubs interested and the work is progressing, but until there is a substantial awakening by the public in general, and the landowners in particular, become aroused and take definite action against the persons who are responsible for the fires, we cannot more than hope for the progress that we should like to make. In other words, we need the deadly weapon of public opinion to help control man's carelessness with fire.

In spite of this pessimistic view we cannot help but refer with some pride to the district records of the past Spring and also those of last year. In 1931 when 196 fires occurred and the fire seasons were considered most severe, only about one-half of one per cent of the forest land in the District burned over and the average acreage per fire was the lowest on record. Only 116 fires occurred in the District this past Spring, which is just about average for the past 10 years, conditions in general were nearly normal, and happily the record of the organization is better still than that of any previous year. This is not being done without a great deal of thought and help on the part of many interested individuals, but a majority of the fires could be so easily prevented. When we consider

that over a period of six years we have approximately 1000 different persons causing forest fires in this District alone, we have reason to marvel at the apparent indifference to forest devastation, the destruction of fish and game life, the despoiling of our park and playground areas, the burning of our watersheds, etc., by the rank and file of our people. How long will it be until we reach these people? This is the problem and the delay is becoming more expensive yearly.

Care and Improvement of Woodland.—Second only to fire in the importance of forestry practice in this region is the care and improvement of the second growth forests. This is naturally a hardwood region. The average per acre value of forest land is unquestionably higher than that of any other forest district in the State. The timber is uniformly good, it is more accessible than elsewhere and it is within a reasonable distance of markets, which means that ordinarily it can be cut at a profit. The lack of these attributes represent a serious handicap to the advancement of forestry in the more remote regions of the State. That the land is being timbered can be shown to an extent by citing that there are more than 100 active sawmills in the District. They are operating at less than one-fourth of their normal capacity at this time, but even so the yearly output reaches more than 4,000,000 board feet. In spite of the falling off of the sawmill production, the forests are yielding probably three-fourths as much timber as in normal times, for much more wood is being used for fuel than in many years.

Studies sometime ago showed that on farm woodlots almost one-half of a cord of wood per acre was taken from such lands. This, of course, was mostly inferior material, and in addition to its fuel value the forest actually was benefited by its removal. This grade of wood sells at \$6 to \$7 a cord. Even if the profit, above cutting, handling and cartage was less than one dollar a cord, some idea may be gained of the tremendous value of it; or if the owners were paid only their wages, still it was well worth while. Altogether the annual timber crop in this District for the past year was worth close to a million dollars, and this too, in spite of the unsatisfactory economic conditions in general, and in the timber industry in particular. This shows use—it shows that our forests are productive even in their present so-called cut-over state.

During this coming winter the forests undoubtedly will be drawn upon even more heavily and rightly so, for there are thousands of acres of timberland in need of cleaning. Some of the lands are

capable of yielding several cords of wood per acre, and if the cutting is done judiciously the treatment will be of great benefit to the remaining growth. The proper treatment of our existing stands is an important problem and cannot be undertaken too soon.

Tree Planting.—The people throughout this District have been unusually active in reforestation. This may be due in part to the precept and example of the Pennsylvania Forestry Association, and the persons connected with it. The Berks County Conservation Association also has been active in fostering reforestation and unusually so during the past 15 years. Other associations, corporations and individuals have helped to create sentiment toward reforestation. All this was needed and unquestionably we ought to have a new stimulant of some sort to more adequately take care of the vast acreage in immediate need of planting. Farms are being abandoned by the dozens, however it may not be advisable to set out all of the marginal lands in trees. If only a portion of the abandoned land and the poorly stocked timberland were set out in trees at our present rate, it would require between 75 and 100 years to complete the job—timber enough to grow two crops on some of the land. There is ample room for constructive work along this line and the sooner it can be speeded up the better it will be.

You may be interested in having a brief summary of the tree planting which has taken place in this District. During the past five years an average of more than a million two hundred thousand trees have been made available annually to private planters in this district by the Department. This represents one-seventh of the annual output of our nurseries. Naturally, many trees for reforestation have been purchased elsewhere as, for example, the City of Reading has planted on the municipally owned watersheds more than a million and a half during the past three years all of which have been purchased from agencies other than this Department. With the number purchased by individuals added to the number sent out by the Department, the yearly total will approximate the two million mark for the District.

Berks County easily leads all of the other counties in the District and undoubtedly in the State in reforestation. Lancaster is second and Chester third in the number of Department trees planted. The first Department trees were set out in Bucks County in 1915, and to date a total of 1,100,000 have been made available to private planters by the Department. Last year the total reached 150,000, a greater number than ever before. There is a

large acreage in the upper part of the county that might well be planted in trees. Land that has been idle for many years and the indications are that it will continue to remain uncultivated. This same condition exists particularly in Montgomery and Chester Counties and in portions of Berks, Lancaster and Lehigh Counties. If five to ten million trees could be successfully planted in this District annually I feel that our reforestation program would be making fair strides.

Parks.—As you know, the Department came into possession of a large portion of the Delaware Canal to be used for State Forest Park purposes. Studies have been made with the idea of formulating a plan for the development of it. It is early to say what can be done. Undoubtedly some plan or definite attitude will be adopted shortly for the handling of it.

The canal is available for recreation in the form of barge parties, and thus far this season 30 such groups aggregating close to a thousand people, have been accommodated. These parties come mostly from Philadelphia and Trenton. Of course, the canal affords an excellent place for canoeing, and is used for this purpose from one end to the other by hundreds of people. It is widely used also for bathing purposes. Aside from this the canal is scenically quite outstanding. The Delaware Valley is said by many to be one of the most beautiful and picturesque in eastern United States.

It is to be regretted that there are not several well established State forest parks in the southeastern part of the State. Certainly parks would find wide use, and no matter where located, they would be little more than one hour's drive from one-third of the State's population. There are areas admirably suited for this purpose, and it is hoped that at sometime in the near future they will come into ownership of the Department.

Conclusion.—In conclusion it is fair to say that forestry in most of its branches is making progress in this section, principally because generally speaking, the people are interested and ordinarily they have the funds to carry out the work. Certainly forest fires should be reduced to a fraction of the number that now occur, and this is our first and biggest problem. The existing woodland should be improved on a scale which the importance of this work demands. And further from five to ten million trees should be planted annually in the district; several recreational areas should be provided; and there are other things, yet there is some satisfaction in knowing that substantial progress in forestry is being made in this section as well as throughout the State.



HOW THE BLISTER RUST DISEASE AFFECTS THE LIVING TISSUES AND BARK OF WHITE PINES.



PLANTING A HEMLOCK TO COMMEMORATE THE 1932 SUMMER MEETING.



RIBES GROWING AMONG WHITE PINES. A BLISTER RUST INFECTION THAT COULD HAVE BEEN PREVENTED.



ALONG THE OLD DELAWARE CANAL. 1932 SUMMER MEETING.



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ALONG THE OLD DELAWARE CANAL. 1932 SUMMER MEETING.

BLISTER RUST THREATENS WHITE PINE IN PENN'S WOODS

By Richard M. May, Pennsylvania Forest Service

A COMPARATIVELY new sprout in the herbarium of forest protection literature is the white pine blister rust. Because this disease has been recently discovered in this country few people know much about it. Because it is a fungus growth with a somewhat intricate life history, the misconceptions concerning it are a legion.

How general is the ordinary layman's lack of information about blister rust was demonstrated not long ago by the remarks of a certain United States senator whose claims to omniscience unfortunately suffered a severe jolt when he tried to explain what it is and what it does. By this time the senator may or may not know the truth about blister rust. Last spring his knowledge of natural history and his naive fancy led him to believe that it was "a little insect that first forms on the bark of the white pine tree as a little worm, develops into a moth or fly, and then flies to a currant bush."

Now, just why should a United States senator, or any one else, be expected to know anything about blister rust? Simply because the disease threatens the destruction of \$420,000,000 worth of white pine timber in this nation. And, incidentally, an important proportion of this forest heritage is a valuable part of Pennsylvania's timber resources.

It is a well recognized fact in the science of pathology—whether of humans or of trees—that you cannot do much about controlling a disease unless you first know something about its nature, cause, progress, and result. What, then, is white pine blister rust?

HISTORY.—The blister rust, a disease affecting the five-needle pines, is probably of Asiatic origin. From its source the disease spread westward through Europe. It is reported to have been found in Germany as early as 1842, and was definitely discovered on American white pine in the Russian Baltic provinces in 1865. The general spread of the disease throughout Europe took place in the years from 1860 to 1890. Blister rust was first reported in Great Britain in 1892; today American white pine, its most common pine host, is of little commercial importance in those islands, because of the ravages of this disease.

It is probable that the rust was introduced into this country on imported white pine planting stock,

exposed to infection in European nurseries. Previous to 1910 it was practically impossible to obtain nursery grown white pine planting stock, suitable for reforestation, in this country. Most of it was grown in Germany from American seed.

The first discovery of the disease in this country was made at Dresher, near Philadelphia in 1905. In the following year the rust was reported on currant leaves at Geneva, New York. Some years later an infection that had occurred in 1897 was found at Kittery Point, Maine.

In Pennsylvania there were no additional reports of blister rust until about 1910, when it was discovered by a State nursery inspector at Chestnut Hill in Philadelphia County. The infected seedlings had been imported from Schleswig-Holstein in 1907. Between 1910 and 1916 infections were found in Berks, Bucks, Cambria, Huntingdon, Monroe, and Montgomery Counties. It is interesting to note that the diseased trees in each of these counties had been raised in European nurseries. In the period 1917 to 1921 the State Department of Agriculture cooperating with the United States Department of Agriculture made occasional inspections of white pine and cultivated *Ribes*, the scientific name used to designate the currants and gooseberries as a group.

In 1921, S. B. Detwiler, chief of the Division of Blister Rust Control of the United States Department of Agriculture, found the rust on pine and *Ribes* near Equinunk in Wayne County. L. W. Hodgkins, federal blister rust scout, found numerous infections in the northern tier counties in 1928, many of them dating back to 1919. It is now known that blister rust was present in that region in 1916 and in Franklin County, in southern Pennsylvania, in 1917.

In 1929, the Pennsylvania Department of Forests and Waters entered into an agreement with the Division of Blister Rust Control of the United States Department of Agriculture and the State Department of Agriculture. The purpose of this agreement was to put into practice a cooperative program for blister rust control, now in operation under the supervision of the Bureau of Forest Protection of the Department of Forests and Waters.

As a result of the scouting carried on in this control program many previously unknown infections were discovered.

In 1931, the blister rust control force removed 67,780 *Ribes* from 13,089 acres of privately owned land. The labor for this work was supplied by the owners. Also 10,927 acres of State Forests were made *Ribes* free by the removal of 761,881 currant

and gooseberry bushes. In addition 4,089,000 white pines growing in the three State forest tree nurseries were protected from blister rust by the removal of all *Ribes* growing around the nurseries.

Up to the present time blister rust has been found on white pine in thirty-nine of the sixty-seven counties in the State. Undoubtedly an intensive search would disclose pine infections in every county in which white pine and *Ribes* are associated.

THE DISEASE.—White pine blister rust is transmitted by means of minute seed-like structures called spores, which are transported by air currents. There are five types of these spores produced at different times in the life cycle of the disease.

They are, first, aeciospores, which develop on infected pines in early spring from April to June. These spring spores transmit the disease to currant and gooseberry leaves, upon the under side of which are produced the second type of spores, which are called urediniospores and are released about May 15. They carry the disease from *Ribes* to *Ribes*. Seven or more generations of these uredinia or summer spores may occur in one summer. In midsummer a third type called teliospores appear on the leaves of *Ribes*. These spores germinate and produce sporidia, the fall spores, a fourth type, which transmit the rust from the *Ribes* to the pine. The fifth type, known as pycnospores, appear on the diseased pine bark from June until winter. These spores are contained in small drops of clear or orange colored, sweet tasting liquid. Their function is not known and apparently only serve to indicate the presence of the disease.

The spores which transmit blister rust from pine to *Ribes* are capable of infecting *Ribes* as far distant as 110 miles, from *Ribes* to *Ribes* as far as 3,200 feet, and from *Ribes* to pine up to 900 feet. However, spores produced on European black currants, it is believed, will produce pine infections as far distant as one mile.

The infection of white pine takes place through the breathing pores of the needles during the season of sporidia production. There follows then a period of incubation of from one and one-half to three and one-half years before the blisters burst through the bark of the diseased trees and scatter the aeciospores.

SYMPTOMS.—The following symptoms are apparent after pine infection:

First Season. A small orange-yellow spot usually appear from six to eight weeks after a sporidium falls on the needle. This stage is not readily identified in the field.

Second Season. Filaments of the fungus grow down the needle into the bark of the branch and spread out to a distance of from one-fourth to two inches. The bark thickens, the twig appears swollen and spindle shaped, becomes pale yellow or slightly orange at the margin of the swelling, and the needle fascicle becomes raised and swollen.

Third Season. The cankered area enlarges; the disease works down the branches toward the trunk. The fluid containing the pycnospores appears in drops and continues to form until winter. When these drops dry there remain liver-shaped reddish brown scars—pycnial scars—which are very characteristic and make identification of the disease certain.

Fourth Season. In late spring or early summer blisters first appear, which break, emitting the orange colored aeciospores. The diseased area continues to enlarge in the seasons following until it reaches the trunk. The root-like mycelia encircle the tree beneath the bark absorbing the food from the sap, thus causing death by starvation.

On *Ribes* the disease first appears as small irregular pollen-like patches of orange or yellow color on the under surface of the leaves. As the intensity of the infection increases, these spotted areas become more numerous until the lower side of the leaf may be completely covered. In midsummer brown hair-like or horn-like projections develop from these patches. These are called telial columns and are composed of the teliospores from which sporidia develop. These columns often become abundant, giving the under side of the leaf a decidedly rusty appearance.

CONTROL.—The important point to bear in mind in regard to this fungus is that it will not spread from pine to pine. In order to complete its life two distinct host plants are necessary. If these two sets of host plants are widely separated, it is apparent that spores produced on one host will die before they reach the other, and therefore, the disease cannot spread. Hence control simply involves the elimination of the less valuable host, which in most localities is certainly the currant or gooseberry bush.

Ribes eradication may be carried on anytime from early May to September. *Ribes* are among the first plants to leaf out in the spring, hence may be detected best at that time. On areas larger than ten acres or where *Ribes* are numerous, this work may best be carried on using a five-man crew and a foreman.

The crew should be lined up abreast, spaced from eight to fifteen feet apart, depending on the width

of the strip to be worked, which in turn is dependent on the ease with which *Ribes* may be detected. The first strip should parallel a road or boundary line, if possible, which helps to keep the strips straight and prevents duplication of effort. The inside man on the crew, marks the edge of the strip by dropping a paper trail. On the return the trail-marker should follow the trail he has laid, and the outside man should lay the new trail for the next strip.

It is the duty of the foreman to zigzag in the rear of the crew, keeping the men properly spaced and in proper alignment. He should also keep the crew's time, tally the number of bushes dug in each strip and keep necessary records for reports. At least two men in the crew should carry light picks or mattocks. All men should wear heavy canvas or leather gloves. The trail-marker should carry a bag containing the bits of paper for marking strips.

All currants and gooseberry bushes must be carefully dug out with all the roots intact. These bushes should be hung up to dry in such a way that no part of them touches the ground. Bushes should not be laid on rocks or stumps, nor should they be hung on white pines.

A five-man crew should average, when working eight hours, about twenty acres a day. Under very favorable conditions they may cover as much as fifty acres. The area worked per day and the width of the strips are governed by the abundance of *Ribes*, the topography, and ground cover.

If pine owners take these necessary precautions, there is no reason why they cannot continue to grow white pine successfully. Blister rust, unlike many forest tree diseases, can be cheaply and practically controlled.

The first Pennsylvania forest fire law was promulgated in 1676 by the Duke of York, brother of King Charles II of England, who had granted his royal brother all the New Netherlands. The penalty for kindling fire in the woods and permitting it to escape to cultivated land was to pay all damage plus one half more as a fine. If the guilty person could not pay he was liable to receive "not exceeding twenty stripes," in other words, be publicly whipped.

In 1683, following the grant of Pennsylvania to William Penn, the next forest protection law was given. Whosoever set on fire woods or marshes was required to make good all the damages.

FORESTRY ASSOCIATION SPONSORS MEMORIAL PLANTING

FOR two weeks prior to Arbor Day (April 22nd), there was active preparation for a George Washington Memorial Tree Planting of rather unusual proportions, 11,000 trees consisting of White Pine, Red Pine and Norway Spruce, on land owned by the Borough of Media and adjacent to the reservoir of the municipal water supply. The planting and preparation for the formal dedication on that date were under the direction of our President, Mr. Samuel L. Smedley, and Mr. John K. Harper, an active member residing near Media and closely allied with a number of Boy Scout Troops, who did a major part of the planting. About two-thirds of the trees were planted prior to the dedication.

Fearing the possibility of inclement weather, part of the exercises were held in the auditorium of the Media High School at 2 P. M., when about 200 school children were addressed by Dr. Edward E. Wildman, Director of Science for the Philadelphia Public Schools; Mr. Edward C. M. Richards, a well-known forester, and Mr. Samuel L. Smedley. Immediately afterward several hundred pupils of the schools, headed by the Elwyn Training School Band, marched to the planting on Ridley Creek just outside the town. Here on an elevation overlooking the surrounding country a flag pole had been erected and other preparations made for the formal dedication, for which Mr. John K. Harper, Scoutmaster, acted as chairman. An invocation was given by Rev. William H. Robinson, pastor of the Methodist Church. Following dedication the principal speaker of the day, Judge Albert Dutton McDade, of Delaware County, referred to the planting as part of the Nation-wide Memorial Planting to commemorate the 200th anniversary of the birth of George Washington. In the presence of a large gathering of citizens of Media and other parts of Delaware County, he said, in part:

"We are here to express our appreciation of the 200th anniversary of the birth of George Washington, and 11,000 trees are being planted in this tract that will be known as 'Washington Memorial Park.' The early settlers, who came to this country to find religious liberty and new homes, found Pennsylvania densely covered with forests. As the years went by, as progress in road building and railroad building was made, these forests practically disappeared. In this generation we have learned the value of forests,

and this year, America has a goal of planting ten million trees as a memorial to Washington."

Judge McDade paid tribute to Sterling Morton, former Secretary of Agriculture of Nebraska, who originated the "Arbor Day" idea in 1872. "Arbor Day is observed by practically every State," he said, "and it means a great deal for the future of our community."

Following his address Judge McDade turned several spadefuls of earth on one of the three larger trees, Red Pine, White Pine and Blue Spruce. Other addresses were given by Mr. Harry C. Johnson, representing Media Council and Mr. John C. Hershey on behalf of the citizens of Delaware County.

WHITE PINE IN THE GALLITZIN DISTRICT, PENNSYLVANIA

By Paul H. Russell, Assistant Forester

IN the northern part of the Gallitzin Forest District there is included in the forest cover probably as high a percentage of white pine as there is in any section of the State. The area, which is comprised of northeastern Indiana County, northern Cambria County and southwestern Clearfield County, is literally dotted with stands of white pine. It is true that most of these stands are rarely larger than several acres and there are only a few large individual holdings. But it should be extremely gratifying to the Forester and to the landowner that such a large amount of white pine, a considerable percentage of which is mature, should still exist. Furthermore, these stands are serving as seed trees and many surrounding waste areas and abandoned fields are being filled in with natural white pine regeneration.

Probably the most interesting of the large holdings is the one owned by the Hegarty Brothers. This area is located at Hegarty's Corners about 4 miles northeast of Coalport, Clearfield County. The whole estate is comprised of approximately 400 acres of which over half is wooded or coming in with natural regeneration. Of the wooded area about 140 acres is white pine of over 20 per cent establishment.

The story of the Hegarty's is rather interesting both from an historical and conservational viewpoint. John Hegarty first settled on the present site in 1820, cleared a part of the land for farming and did some lumbering always with a view, however, of perpetuating the stand. His son, Samuel Hegarty, followed the same principles of

cutting only diseased, defective and down trees and utilizing them to the best advantage. The present generation consisting of Allison L. Hegarty, W. W. Hegarty and J. C. Hegarty hold the estate jointly and abide by the same principles as their predecessors. As a consequence there still remain on the area some original pine. It is true that they do not of themselves form even a 20 per cent stand but as many as it was possible to save still remain. Only as soon as one is about to fall prey to some natural destructive influence is the axe used. Probably a much larger acreage of original pine would remain were it not for the severe storm of 1852 at which time a large portion of the white pine were windthrown. These were consequently utilized and the area is now stocked with an even-aged stand which is just approaching maturity and which covers an area of probably 35 acres.

Probably the largest original pine on the area measures about 13 feet in circumference and has attained a height of about 140 feet. The others range only slightly smaller in size, the greatest variance being in circumference. It is the writer's opinion that these can be numbered among the largest white pine in the State.

But probably the most encouraging feature is the amount of young white pine coming in. These are grouped in even-aged stands averaging about 20 years in age. If these stands are protected from insect attack, and they are no longer very susceptible to weevil, and from fungus disease such as blister rust they will soon grow into merchantable size and help swell the already comparatively large acreage of natural white pine reclaiming old fields to their original use. Since, supplementing the Hegarty white pine are many more acres of mature and restocked pine immediately surrounding the estate.

Another area which is of interest due to the large amount of mature white pine is the Babcock tract in close proximity to the small town of Westover. This stand is now owned by Mrs. Musser, of Allentown, and was originally used as a Game Preserve. Nearly every draw of this sizable tract is stocked with white pine which is mature or rapidly approaching maturity, the total area amounting to about 100 acres or more.

Keeping in mind that the aforementioned areas are only a small percentage of the numerous stands, ranging from 2 to 100 acres and more, and ranging in size from seedlings to mature timber, which are sprinkled liberally over the northern townships of the Gallitzin Forest District, the question of what is to be done to conserve and

utilize this heritage should take a prominent place in the Forester's and landowner's plans.

In the first place, no better policy of utilization could be carried out by the individual landowner than that practiced by the Hegarty brothers, namely, cutting only fully mature and decadent trees and keeping the future of the stand thoroughly in mind. In the second place, the owner should be led to realize the value of protecting the stand from the influence of destructive diseases, and at the same time given aid in the application of protective and preventive measures. In developing a plan of protection, the Forester will, as always, be compelled to make the contacts and break through the lethargy which seems to be a general characteristic of the majority of forest land owners. If these contacts could be made, there can hardly be any doubt as to the values resulting from the increased forest-mindedness of the owner and the improved condition of his stand.

On a boulder at the foot of an elm on the Cranston Farm located in Moon Township, Allegheny County, and owned by Stuart Johnson, 221 Fourth Avenue, Pittsburgh, is a zinc etched plate inscribed as follows:

"An elm was grown at Craige Mansion, headquarters of George Washington, commander of the American Army at Cambridge, Mass. Craige Mansion was later the residence of the poet, Henry W. Longfellow. From that elm there was sent to the Honorable William S. Bissell a seedling, and from his tree a seedling was planted at Cranston Farm in 1930, from which was grown this elm, a grandchild of the Craige Mansion elm, commonly known as the George Washington elm."

Pennsylvania has more home owners than any other State, with more than one million families living under their own roofs. Approximately one-half of the people live in their own homes in the smaller towns and cities, and it is only in the larger cities that home ownership falls below fifty per cent.

The first place that a lumber shortage is felt is usually in the home and today the shortage of local timber for building homes is a vital problem in the everyday life of our people. Pennsylvania imports four-fifths of her lumber needs and nearly one-half the cost of this lumber has become a freight charge, which is an added cost to home construction.

SOME SURVIVORS OF PENN'S WOODS

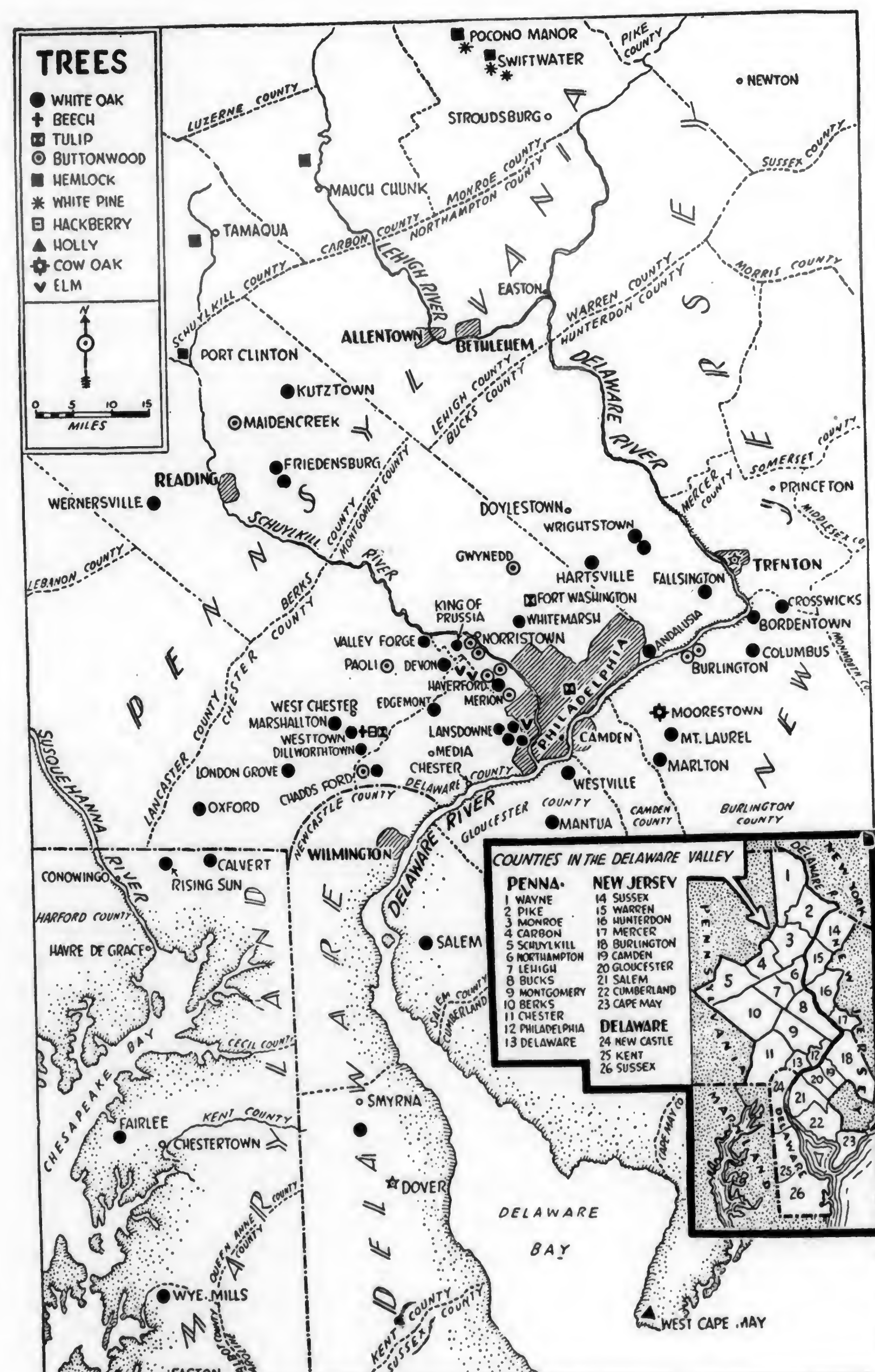
THE Schools Committee on Penn Memorials has prepared and published a pamphlet "On the Natural History of William Penn's Delaware Valley and Ours." In a chapter entitled "Penn's Own Account of His Valley," they quote from his report written to his representatives in London, in which he said: "The trees of most note are the black walnut, cedar, cypress, chestnut, poplar, gum-wood, hickory, sassafras, ash, beech, and oak of divers sort, as red, white, and black, Spanish, chestnut, and swamp, the most durable of all; of all which there is plenty for the use of man."

The following chapter, whose title we have used to head this article, states:

"Vast changes have taken place in Penn's Delaware Valley since that letter was written. The very name, Pennsylvania, was given his province because of its forests, which then covered 28,000,000 acres. These forests have disappeared. What is there left of that abundance of wild life described by Penn in August, 1683? Are there any survivors of these forests? Yes, there are a few on both sides of the Delaware.

"These trees are indeed monarchs of the past. They inspire our awe and veneration. One of them, which stands near Friedensburg in Berks County, was called the Sacred Oak by the Indians centuries ago, because they felt that they got healing and courage from the strength of its great branches and trunk.

"These trees are the last living links we have with that far off day when William Penn arrived in America and did so much here for the welfare of his fellow men. They are listed here, in the hope that the boys and girls now in school will see to it that they are perpetuated for centuries to come as Penn Memorial Trees, by gathering seeds from them, planting and guarding these, and when the seedlings are strong and large enough, reset them in some public park near the school where they will have perpetual care. These Penn Memorial Trees should bear the date and the name of the school. Seeds should be gathered when ripe, and planted before they become dry, as they die quickly, especially the acorns. These should be gathered in September or early October, and planted at once, where they will be well guarded from animals. Schools near any one of these trees will do more distant schools a service by starting a number of seedlings and sharing them. Where it is possible to find seedlings already started under these trees, much time can be saved. But these are very rare."



Reprinted by courtesy of the Evening Bulletin and Schools Committee on Penn Memorials.

Then followed a list of the trees which had been located and examined up to publication, together with location and circumference five feet above the ground.

This data was given the newspapers, which gave the matter publicity, illustrated by photographs. Subsequently one newspaper, *The Evening Bulletin*, of Philadelphia, made a special feature of these trees and the correspondence regarding new trees and the increases to the original list. We are indebted to this newspaper and to the Schools Committee on Penn Memorials for permission to reproduce the map, originally prepared by *The Evening Bulletin*, which is given in this issue. It should be remembered that this was prepared previous to the flood of letters which have recently poured in, suggesting certain large trees for "membership in the Penn Tree Club."

This work has clearly brought out that size alone is not a determinant of age. Rapid growing varieties, favorable conditions of soil, exposure and availability of water, have produced a number of trees of unusual size, but whose span of years is less than 250. And conversely there are instances where trees of slow habit of growth, located where poor soil and habitat militate against development, have been shown by records or increment borings to be of an age which permits their inclusion in the list. The total to this writing was 207, with the prospects of a number of additions. We append a list of some of the larger trees.

Editor

FOREST LEAVES:

Here is the requested suggested list of Penn Trees promised today. You will note that most are in the part of the State longest settled—perhaps because they found sanctuary there through sentiment and otherwise.

A few of the 200 or more found to date:

P-blazed white oak, Luff farm near Wrightstown, on northern boundary line of Penn's first purchase, July 15, 1682.

Two white oaks at Friends' Meeting House, Fallington, where Penn worshipped while living at Pennsbury four miles south on the Delaware.

Two or three white oaks at the Neshaminy Presbyterian Church of Warwick, near Hartsville, Route 611.

A tulip at Stenton, the home of James Logan, 17th and Lindley Avenue, Philadelphia.

An elm, St. Elizabeth's Convent School, Torresdale.

A sour or black gum, on Ray farm, Route 29, two and a half miles from Phoenixville.

A beech, Chester Pike and Boone Avenue, Glenolden.

A hackberry and other trees at Westtown School.

A white pine and oaks on Indian Lane, a mile south of Media.

An ash, on Route 129, Glen Mills.

A hemlock, Friends' Burying Ground, Marshallton, Chester County.

The largest white oak on record in Pennsylvania, quarter of a mile west of Cochranville.

A white oak, a mile west of Dilworthtown.

A buttonwood a mile east of Chadd's Ford, Lafayette's Headquarters.

A white oak half a mile south of New London.

A white oak at Donegal Presbyterian Church, "Witness Tree," between Mt. Joy and Marietta, Lancaster County.

A black oak, at Forty Fort, east of Wilkes-Barre on the south side of highway.

A buttonwood near Goshen, Lancaster County.

Fourteen thousand acres of the primeval forest are still standing on East Branch of Tionesta Creek in Warren and McKean Counties. Must we watch this "last stand" of Penn's Woods fall before the lumberman's cutting tools within the next decade? Can we not secure at least 250 acres of it as a perpetual memorial to Penn in this the 250th anniversary year of his coming?

Very truly yours,

EDWARD E. WILDMAN,
Chairman, Schools Committee,
on Penn Memorials.

NEW PUBLICATIONS

THE TREES OF THE YOSEMITE.—8 vo. 133 pages, illustrated, bound in cloth. By Mary Curry Tressider and Della Taylor Hoss, Stanford University Press, Stanford University, California.

This is a popular account of the Trees of the Yosemite, California, by Mary Curry Tressider, with 34 Linoleum Block Prints by Della Taylor Hoss. It also includes some of the native bushes.

It is a valuable guide for anyone who desires to visit the Yosemite National Park and become acquainted with its arboriculture.

MATÉ AN IMPORTANT PRODUCT OF BRAZIL

BRAZIL produces each year about 200,000 metric tons of maté, the dried leaves of certain Ilex species used for making tea, according to a report by C. R. Cameron, American consul at Sao Paulo. In 1928 the Brazilian exports of maté were valued at \$13,748,323, being exceeded in value only by exports of coffee, of hides, and of cacao. Argentina produces about 20,000 tons of maté annually, Paraguay about 12,000 or 15,000 tons. The drink prepared from maté leaves is used by many millions of South Americans and is now being introduced into the United States. It is mildly stimulating and contains a much smaller quantity of tannic substances than the tea of China.

About 20 of the 60 species of maté found in Brazil serve more or less satisfactorily for beverage purposes. The one most favored is Ilex paraguariensis, found principally in the basin of the River Plate from 18 degrees south to about 30 degrees south. In the forest this species attains a height of 50 or 60 feet. Usually the maté tree is absent from a belt 10 to 30 miles wide along any large river. It prefers depressions in the foothills and mountains and an altitude of from 1,500 to 2,500 feet. It is frequently associated with the Parana pine. At present important commercial forests of Ilex paraguariensis are found in southern Matto Grosso, central and western Parana, western Santa Catharina, and north-western Rio Grande do Sul, all in Brazil. Others are found in eastern Paraguay.

The fully developed leaf of maté is preferred for harvesting, and the harvest usually takes place during the fall and winter, that is, from May to October. Cutting at intervals of 3 years is thought to result in a superior grade of the commercial product. The cut branches of green leaves are first toasted over an open wood fire and then thoroughly dried, usually on a framework of poles to which hot air is conducted through a subterranean canal from a fire built some distance away. The dried leaves are threshed and then, according to the best practice, are allowed to season for a few months.

Brazil has not yet developed commercial plantations of maté. The Argentine Territory of Misiones, however, is developing such plantations on a large scale. One of the great difficulties in establishing plantations is to obtain seedlings; the seed, being inclosed in a gelatinous covering and

a stout epidermis, sprout very slowly. In Argentina the seed are scattered on a very finely pulverized seed bed, covered with 2 or 3 centimeters of earth, and watered once a day, or oftener in dry weather. If the planting takes place in March, general germination normally occurs in September and some seed continue to sprout until December. The young plants must be carefully shaded, both in the seed beds and after transplanting. The trees are pruned each year, but the first harvest is deferred until they are 4 years old.

B. N. Spehrley, of Pottsville, is an enthusiastic tree planter and in a recent letter to Mr. Meek, Chief of the Bureau of Extension, stated that his plantations are doing exceptionally well and that they materially improve the appearance of the area in which they are planted.

In speaking of the change which has taken place in Tumbling Run Valley, Schuylkill County, he states: "For forty years I have watched the old farmers clear land and plant the cleared areas with agricultural crops. Later the land was abandoned and now I again see this land coming back into valuable timber growth."

A man who has had a most important effect upon the forest industries of the world is today practically forgotten, although he has been dead only eighty-nine years. Even the mention of his name brings no recollection as to who he was or what he did. He was Benjamin Cummings who was born in 1772, the inventor of the circular saw now in use over the entire world. About 1820 Benjamin Cummings, at Burtonville, New Hampshire, where he practiced blacksmithing, hammered out on his anvil the first circular saw. Although his invention will probably live for all time, Benjamin Cummings himself is practically forgotten and it is probable that his grave in Kalamazoo County, Michigan, is unmarked.

One-third of all farms in the United States yield as much as \$220 worth of timber per year, the United States Department of Agriculture says. An exhibit from the Forest Service shows that the annual farm forest crop is worth \$395,000,000. Timber not only pays in dollars and cents, but it is like a bank account upon which the owner can draw in times of stress. Its uses range from farm buildings, telephone poles, repairs, and fuel on the farm, to saw logs, cross-ties, pulpwood, posts, and poles.

FOREST LEAVES

JANUARY, 1933



Photo Courtesy Department of Forests and Waters

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PENNSYLVANIA FORESTRY ASSOCIATION
PHILADELPHIA, PA.

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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 306 Commercial Trust Building, Philadelphia.

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EDITORIALS

We note with sorrow the passing of Mrs. Maria Coxe, of Drifton, a member and friend of this Association, and whose name is listed as a member of Council on the original Charter, dated in 1889. She was also actively interested in the founding and continuance of the Anthracite Forestry Association. Her charities were many and her gifts frequent, and her work for the welfare of those living in the anthracite coal fields received a wide recognition which she earned, but never sought. Some of our older members can recall how she sustained and aided this Association and its work in earlier days, and we know that the cause of forestry in Pennsylvania has lost a member whose interest and help were freely given.

Also we have recently lost another member of long standing, and who for years and up to this past month participated in our Council meetings. Mr. Eli Kirk Price, widely known for his civic interest and activities in Philadelphia, especially as an active and energetic Vice-President of the Fairmount Park Commission, maintained an active interest in forestry and showed it by his work. To him is credited the planting of 100,000 pines in Fairmount Park. The Park Commission and this Association were but two in the many public and civic movements in which Mr. Price was a planner and a creator, and his passing is viewed with sincere regret.

By the death of Judge Frank L. Harvey, of Foxburg and Clarion, a former member of the State Forest Commission, we have lost another member of Council and a member who for many years was an advocate of forestry and a worker for it. When this Association held its Summer Meeting at Foxburg he aided to make it a success, and at all times gave his sympathy and activity to the work.

The 1932 Annual Meeting and the interest shown by those attending demonstrated the continued and increased appreciation of the forestry movement. Such projects as those discussed by Mr. Cope and Dr. Wildman are real stimulants to forestry and the interest shown was most heartening. This

Association has gone far and achieved much since a small group first met, over forty years ago, to discuss how public interest could be awakened to methods of restoring the depleted timber, reduce the erosion and unusability of cutover lands, and improve the streams of the State and the health of its people.

The question having been raised whether FOREST LEAVES should make a change in its cover, the suggestion has been made that members be requested to submit their ideas. These will be welcomed, for anything which adds to the appeal of our publication is a help to our work and to the interests of forestry.

Those who were unable to hear Mr. Cope's talk on the virgin forest tract in the western part of the State, will find in this issue an article on a visit by some of our officers and members to a portion of the area, written by Vice-President Richards. As Mr. Cope remarked, the areas of such land remaining are so few and many of them so small, that an effort to save this irreplaceable growth merits our active support.

It was with interest and pleasure that we noted in the press of a conference at Harrisburg to advance a plan to plant a George Washington Memorial Forest in Palestine, sponsored by the Jewish National Fund.

Through the publications of the Department of Forests and Waters there have been a number of references to work given the unemployed in the State Forests. The Department and its employees have been mindful of this situation, and in a number of cases have been able to extend the work through the cooperation of local relief agencies. The results have been work and wages or food orders to unemployed, large quantities of fuel delivered to the needy, and a resulting benefit and improvement to the State's resources by the work done. Elsewhere in this issue is noted a summary of such work for a recent 15 week period.—C. P. B.

Tree lovers throughout the State will be interested to learn that Pocono Manor Association,

owners of a summer resort, in Monroe County, Pa., has recently recovered a verdict for \$1555, before a jury in Philadelphia County, for damages incurred through a forest fire negligently set by a contractor in Monroe County, Pa., in 1928. The fire burned over an area of 172 acres of timberlands, some of which contained a setting of 25-year-old red and white oaks interspersed with other less valuable trees.

The President of Pennsylvania Forestry Association, Samuel L. Smedley, is a Director of Pocono Manor Association. Two witnesses for the plaintiff were Professor Cope, of the Cornell Forestry School at Ithaca, New York, and Professor Ralph C. Hawley, of the Yale Forestry School at New Haven, Conn. The latter has served for many years as Forester for New Haven Water Company and for New York, New Haven and Hartford Railroad Company.

Since this case was tried on November 22nd last, two other disastrous fires have occurred in Barrett Township, Monroe County, one of which burned over an area of 2,000 acres. It is alleged that these more recent fires were set by deer hunters. The Monroe County Court has appointed C. R. Bensinger, Esq., as a Special Deputy District Attorney, to conduct an investigation of the setting of the fires, of the diligence of the local forest officials and also of alleged violations of the hunting laws in shooting deer at night with flash lights. It is scarcely conceivable, in these days of alleged good sportsmanship, that such methods can be practiced. It seems, however, that the citizens of Monroe County are patently careless in appreciating the potential value of their forests, both commercially and for resort purposes. It has been very pertinently suggested that the forests of Monroe County should be closed in 1933 and possibly longer, for hunting and fishing purposes, so that the game slaughtered by illicit means may have a chance of replacement, and also that the reputable citizens of Monroe County may bring to bear upon their careless residents or visitors the gravity of the situation.

At any rate, it is refreshing to find a verdict carrying monetary damages with it that has been visited upon one careless contractor. Perhaps this instance will have some weight in curbing the dastardly wrecking of public interests.—F. R. T.

The cover page shows "An Ancient Monarch—The Kutztown White Oak," which sheltered a wagon train of the Continental Army during the Battle of Germantown.

1932 ANNUAL MEETING

ON December 12, 1932, the Annual Meeting of the Pennsylvania Forestry Association was held in conjunction with a luncheon at the Adelphia Hotel in Philadelphia. Fifty members and their friends were welcomed by President Smedley, whose Presidential address is given later in this issue.

To save time for the speakers the secretary's report was not read, a few excerpts being given to show the progress in forestry both in the State and in the Nation. The text of the report is printed in this issue and is commended to our readers to acquaint them with the activities in this work and its magnitude.

Following the distribution of ballots, officers and members of Council were elected, as shown on list published in this number.

Mr. Charles R. Meek, Chief of the Bureau of Forest Extension, of the Department of Forests and Waters, told why the State sells little trees for forest planting. He said that the early years of the department were devoted largely to land acquisition. Then followed reforestation of State-owned lands where needed; and as rapidly as practicable. Planting on the State Forests is not a large problem, because most of the land already supports valuable forest growth. A consistent program of State Forest planting is arranged to proceed as rapidly as funds will permit.

Much of the privately-owned land never was justified in being devoted to farms. It reverted to non-use as agriculture became more intensive. Now we have in Pennsylvania, according to the census, 29,931 abandoned farms with 2,722,127 idle improved farm acres. It is believed that there are a total of five or six million acres of idle land of all classes in our State; and for three million acres of them, reforestation is the best practical use to which they can be put.

In 1910 there developed a demand for little trees to plant on privately-owned idle lands. Since then, at least 100,000 acres of private land have been reforested at the expense of the owners. Planting trees, adds not only to the future timber supply, but also, is of material benefit to all the people, on account of prevention of soil erosion, conservation of water and game, and provision for areas for general recreation and health.

The laws do not permit the use of State trees for any purpose except reforestation. The law of 1927 is very definite that no trees gotten from the State since that time can be used for shade or ornamental purposes. The Department of Forests

and Waters is ready to enforce the 1927 law, and in cooperation with the Department of Agriculture and the Commercial Nurserymen's Association, to do everything possible to prevent any trees gotten from the State at any time from being used in competition with the stock produced by commercial nurseries for shade or ornamental purposes, and contrary to the spirit of the present law. Before trees can now be gotten from the State for reforestation on private land, the owner must sign an agreement with the Commonwealth to the effect that they will be used for reforestation only, and planted in accordance with the principles of forestry.

Then Mr. Francis R. Cope, Jr., spoke regarding the tract of virgin forest remaining on the East Branch of Tionesta Creek. He eloquently described the impressiveness of the few remaining monarchs of our former forests, and referred to Dr. Bailey's book, "The Holy Earth," which illustrates how man has used so many of our natural resources with no effort at replacement. He quoted Mr. R. D. Forbes's definition of "Our Virgin Forest—A Priceless Scientific Laboratory." It was Mr. Forbes, Director of the Allegheny Forest Experiment Station, who first told the Council of this Association of his thought to save at least a part of a virgin forest of 4500-5000 acres still belonging to the Central Pennsylvania Lumber Company in Warren and McKean Counties. Aside from this tract, the remnants of our primeval forests are "Heart's Content," the Cook Forest, an area around Lake Ganoga and down Kitchen Creek, the Silver Lake tract of 700 or 800 acres of uncut hemlock and hardwoods, with some white pine, and 6 small forest monuments. But in this Tionesta tract hemlock is dominant, and on one stump trained foresters carefully counted 560 rings of annual growth. This tree, said Mr. Cope, went back to the days of Joan of Arc, and in this region centuries of growth have worked out the problems of balance of light and shade, tree growth and underbrush, and similar natural actions. If such a stand is destroyed men must plan and watch for several centuries to replace such conditions.

The committee on this tract appreciates the present difficulty of finding means to save such an area, or even a part of it. However the unusualness and grandeur and value is such that they feel the effort should be made. He referred, as a goal, to the plan suggested by Mr. L. L. Bishop, Supervisor of the Allegheny National Forest, and Mr. R. D. Forbes, that a chosen tract of 250 acres be set aside as a permanent research laboratory for study and investigation by trained scientists

only. To protect this area from the attrition which always progressively destroys the edge of an exposed old forest, this should be surrounded by a larger tract, preferably of four to five thousand acres for demonstration and recreation, and if possible the balance of this ancient heritage should be preserved, the remaining 5,000 acres to be held as a reserve area. Thus the total area approximating 11,000 acres could be linked in with the Allegheny National Forest, whose administrators would protect and care for it.

Mr. Cope closed with an appeal to his listeners to think and plan and work, so that the people and the State and the Nation may be enriched by the preservation of this grand and irreplaceable remnant of Penn's Woods.

Dr. Edward E. Wildman then told briefly of the work in the search for Penn Trees, specimens which were growing in the Delaware Valley when Penn first visited here. He related how the idea of locating such trees had been developed by the Schools Committee on Penn Memorials, who had located and listed some of these. One of the Philadelphia newspapers, the *Evening Bulletin*, had noted this and took up the idea with one of the staff and immediately gave it publicity, printing the list of trees and several photographs, also a special article on the subject. The resulting publicity gave an enormous impetus to the movement, many people became interested in the search and sent in memoranda of large trees on their own and on other properties. The *Bulletin*, to whom we are much indebted for their participation, continued to publish letters sent to the committee, obtained and reproduced photographs, and the matter grew, until when a halt was called by the committee in November, there had been 40 articles published in the *Bulletin*, and the committee had received 600 letters nominating 740 trees as "Penn's Trees." Of this number nearly 400 are considered as eligible to "The Penn Tree Club."

Dr. Wildman spoke of the great help given by a number of people, especially mentioning Mr. Moon and Mr. Fritsch, of Pennsylvania, and Mr. Taber and Mr. Cooch, of Delaware, for their work in locating and measuring trees, and Mr. Moon and Mr. Tyler for their volunteer work in taking increment borings to determine rates of growth of a number of trees.

As he spoke Dr. Wildman passed about a number of photographs of Penn Trees, relating the type and location. He concluded by mentioning a plan whereby a record would be made of this work in a publication by the committee, cooperat-

ing with the Conservation Committee of the Federation of Pennsylvania Women, the Delaware Valley Naturalists Union and the Pennsylvania Forestry Association. Material had been prepared and estimates obtained on the cost of publishing a small book, which would list the trees and their locations, as well as some other trees of special interest, and illustrate the present appearance of some of the old trees. An attractive jacket design has been made by the artist, R. Blossom Farley. He said that if sufficient subscriptions were received the book could be sold for the cost of printing, binding and mailing, or one dollar each, and asked that those who wished copies for themselves and who would donate copies advise him. The donated copies were to be sent to Superintendents of School Districts and Boy Scout organizations in the region. The immediate pledges for 102 copies, many of which were to be donated, indicated the interest in this project.

This closed the 1932 Annual Meeting, which was a pronounced success and indicated the interest in the Association's work.

OFFICERS AND MEMBERS OF COUNCIL ELECTED AT ANNUAL MEETING

December 12, 1932

President, Samuel L. Smedley.
President Emeritus, Dr. Henry S. Drinker.
Vice-Presidents, Robert S. Conklin,
W. B. McCaleb,
Edward C. M. Richards,
Francis R. Cope, Jr.,
Edward Woolman.

Treasurer-Secretary, C. P. Birkinbine.

COUNCIL

Allegheny County, Frank J. Lanahan,
George M. Lehman,
Hon. Walter Lyon,
John E. Potter.
Beaver County, Robert W. Darragh.
Berk County, Mrs. Edward Brooke,
Dr. George G. Weinrich.
Blair County, W. A. Silliman.
Bradford County, Miss Margaret Stewart Maurice.
Bucks County, Mrs. Elizabeth F. James,
David Burpee.
Cambria County, P. L. Carpenter.
Cameron County, Josiah Howard.
Carbon County, A. C. Neumuller.
Centre County, Arthur C. McIntyre,
Prof. J. A. Ferguson.
Chester County, Robert G. Kay,
Norman Ratchford,
Dr. H. A. Rothrock.
Clarion County, R. W. Stadden.
Clearfield County, W. F. Dague.
Clinton County, Charles Hogeland.
Columbia County, C. R. Woodin.
Cumberland County, J. S. Illick.
Dauphin County, W. Gard Conklin,
George H. Wirt.
Delaware County, Ellwood B. Chapman,
Herman Cope,
Edwin A. Hoopes,
Dr. J. Clinton Starbuck.

Erie County, Miss Dorothea K. Conrad,
George S. Ray, M.D.
Franklin County, George S. Perry,
John R. Williams.
Fulton County, W. L. Byers.
Greene County, M. E. Carroll.
Huntingdon County, Mrs. J. C. Blair.
Indiana County, Hon. Joseph O. Clark.
Jefferson County, W. N. Conrad.
Lackawanna County, Mrs. J. Benjamin Dimmick,
Hon. L. H. Watres.
Lancaster County, J. Harold Brillhart.
Lawrence County, Wm. M. Brown.
Lebanon County, Wm. C. Freeman.
Lehigh County, General Harry C. Trexler.
Luzerne County, J. M. Sloan,
Cornelius B. Kunkle,
F. N. Kirby,
William R. Ricketts,
Samuel D. Warriner.
Lycoming County, Henry E. Kirk.
Mercer County, George Rettig.
Mifflin County, F. W. Culbertson.
Monroe County, J. A. Seguire.
Montgomery County, Mrs. Albert C. Barnes,
Miss Mary Blakiston,
Frank B. Foster,
H. Gleason Mattoon,
Miss Mary K. Gibson,
Edgar W. Nicholson,
Francis R. Taylor.
Montour County, H. T. Hecht.
Northampton County, Prof. R. W. Hall.
Northumberland County, Charles Steele.
Perry County, Benjamin D. McPherson.
Philadelphia County, Dr. J. M. Anders,
Richard L. Austin,
Samuel N. Baxter,
Owen M. Bruner,
W. Warner Harper,
Grover C. Ladner,
J. Franklin Meehan,
John H. Webster, 3rd,
Albert B. Weimer,
Dr. Edward E. Wildman.
Pike County, Hon. Gifford Pinchot.
Potter County, Harry E. Elliott.
Schuylkill County, A. C. Silvis.
Somerset County, V. M. Bearer.
Sullivan County, E. F. Brouse.
Susquehanna County, Dr. Frederick C. Brush.
Tioga County, Paul H. Mulford.
Union County, Raymond B. Winter.
Venango County, S. Y. Ramage.
Warren County, Walter W. Beaty.
Wayne County, Hon. Alonzo T. Searle.
Westmoreland County, Hon. D. J. Snyder.
York County, Edgar P. Kable.

Among interesting facts presented in the Service Letter are:

That there are about 800 different kinds of wood known to the timber trade.

Sixty-five acres of forest, the equivalent of more than 40,000 giant trees, were used in one year to make postage stamps.

Sourwood (*oxydendron aboretum*) one of the rarest trees in Pennsylvania has been found growing naturally in Fayette County. There has also been found near Connellsville a small grove of Kentucky coffee trees, which are rather rare as a natural occurrence in this State.

PRESIDENTIAL ADDRESS

IN reviewing the activities of the Pennsylvania Forestry Council for the past year, it is but fitting that we first recall the great loss the Association has suffered in the death of Frank L. Bitler. Identified with our organization since its inception, always most interested in everything pertaining to forestry, his many years of observation and experience made his counsel and advice most valuable to those associated with him in the management of this Association. For many years he compiled and edited FOREST LEAVES, for which we are most grateful.

Those interested in trees and forestry can take new courage and inspiration from the great activities going on throughout our country the past year in matters pertaining thereto.

Possibly the most outstanding act in this connection was launched about a year ago by the American Tree Association, to plant throughout our country 10,000,000 trees as a living memorial to George Washington, it being the 200th anniversary of his birth. This thought seemed to find a very responsive ear, for not only in our own country, but throughout the world, memorial trees were planted. Boy scouts, civic organizations, women's clubs, school children, everywhere there were those who seemed to catch the inspiration, until now, by reports just received from Washington, the total number is near 25,000,000. Forest planting averages about 1,000 trees to the acre. This number, so distributed, would cover 25,000 acres, an area about 8 times the size of Fairmount Park.

Another most interesting contribution known as the National Nut Tree Planting Project was carried throughout our country by boy scouts, school children, and others interested. Excursions were made to Mt. Vernon, Gettysburg, and other historic spots where nuts were gathered, cared for, and distributed to those desiring such to plant on home grounds, about schools, or on farm lands. As in most great movements of this kind one person is largely responsible for the vision. In both of these references Charles Lathrop Pack was the principal.

George Washington has not received all the honors from our tree lovers. William Penn, the founder of Penn's Woods, anteceded George Washington by 50 years, and he has not been forgotten in the movement to plant trees. Dr. Wildman will tell you of the wonderful interest he has aroused in the trees that were personal friends and acquaintances of William Penn. This interest has not been confined to this country alone, for on the

250th anniversary day of Penn's leaving England, Sept. 10th, 1932, members of the English Friends Historical Society and of the Penn Club, journeyed to Jordens and elsewhere in Buckinghamshire where Penn lived, gathered acorns, and through the U. S. Department of Agriculture, they were forwarded to Charles F. Jenkins, President of the Friends Historical Association of this country, who has distributed many of them to institutions and individuals in these parts. It is hoped that, within a few years, there will be many anniversary oaks in this country with a true English pedigree.

This act alone should serve to promote a greater friendship between us and our friends across the water, and as these oaken ties grow in size and strength, may Penn's good will towards all be literally fulfilled.

Your Council has been mindful of their duties as to watching legislative action at Harrisburg. The extra session of the Legislature was thought to be an opportunity to make an appeal on behalf of the unemployed on our state forest lands, as this has been worked out satisfactorily in other states, why not here?

Visits were made to Harrisburg, and every member of the Legislature circularized. Attention was called to the fact that all money so expended would revert back to the state. As the great question of providing for the unemployed has not yet been settled, possibly before our present economic conditions are fully reorganized, forestry will come in for her share.

It was the privilege of some of us on October 16th to visit some primeval forest lands along the east branch of Tionesta Creek near Sheffield, Pa. As Mr. Francis Cope will report on this trip in detail, I will make no further comments than to state that we should use every effort to have this one of the few remaining pieces of Penn's Woods set aside before it is gone forever.

Another item of interest to foresters and one which has been pending in the courts for some four years is the award of damages caused by a forest fire at Pocono Manor, Pa. The cause came up in Philadelphia Common Pleas Court on November 14th. Pocono Manor was represented by Francis R. Taylor, a member of our association. Action was to recover damages from a forest fire caused by carelessness on the part of the contractor who was building a concrete road for the State Highway through the Manor property on May 12th, 1928, and burned over 172 acres.

Two of the outstanding experts on forestry matters in the United States, Professor Cope, of the Cornell Forestry School, and Professor Hawley,

of Yale Forestry School, were called in to testify as to the potential value of growing timber, with the result that a verdict of \$1,555.80 was awarded Pocono Manor. Such awards as this act as stepping stones towards establishing values of young growing timber, and as a warning to the seriousness of starting forest fires.

In this connection, I would call your attention to a number of very disastrous forest fires during the past summer, and from rumors, these were started with incendiary intent. One on the Pocono Manor property and extending west over several thousand acres at a time of extreme drought, in many places burned the soil to a depth of several feet. Growing trees of considerable size had the roots burned from under them. Within the past week, two fires aggregating some 7,000 acres near Buck Hill Falls and Canadensis, right in the heart of Monroe County's most scenic parts, did great damage. It is reported that one of these fires was caused by deer hunters who could not hunt on posted property, so started the fires to drive the deer out. If this be true, it should be the duty of the Department of Forests and Waters, the State Game Commission, and everyone interested in the preservation of our forest and game to see that such persons receive punishment to the limit of the law, as they are a menace and disgrace to any civilized community. We should, at this time, extend our heartfelt sympathies to the Pocono Forestry Association, the most active local association in the state, and to have this happen right in their midst is, to say the least, most discouraging. If any of you have the opportunity to attend any of their summer meetings, by all means take advantage of it as they are more than worthwhile.

Many of you attended our summer meeting held at Doylestown and Washington Crossing. To those who were not there, I would say that they missed some very delightful experiences. Visits were made to the newly acquired State Park along the Delaware River. While at Washington Crossing, we planted a State Tree (The Hemlock) as a memorial to George Washington. We listened while at luncheon to a beautiful word picture of Washington crossing the Delaware by Colonel Henry D. Paxson.

We are continually reminded by articles in newspapers and magazines of the ever increasing interest in forestry throughout our country, and from what has occurred under our individual observation the past year, we can easily imagine ourselves on the eve of a greater awakening and appreciation of the intrinsic and aesthetic value

of our trees and forests; at which time the honor of being a member of a forestry organization will offset any necessity of soliciting for new members; but until then, we are looking for each member to enroll at least one new member each year, ever remembering that our Association has purposely avoided competing with the many worthy demands for charity. But our activities have included interests in matters which would give work to the unemployed to improve the value and protection of assets of the state with a large monetary value. Also we feel justified in maintaining our work, since provision for the future must not be allowed to lapse. Therefore we ask those who can, to give us the small financial support which our membership entails, and to tell others of this important work.

GIFTS OF FOREST LANDS

In the latter part of 1932 four States received gifts of forest land from individuals. Mr. Archer M. Huntington and his wife, Anna Hyatt Huntington, of New York City, deeded to the New York State College of Forestry 13,000 acres of forest in the Adirondack Mountains. The tract contains two large and numerous small lakes, streams, marshland, wooded slopes and two mountains, and is exceedingly rich in the flora and fauna of the region. It will be used for experiment and research in relation to habits, life histories, methods of propagation and management of fish, birds and game and fur-bearing animals and directly in the promotion of forestry as an aid to game management.

Mr. H. C. Thompson, of Oaklawn, Louisiana, has donated two tracts of forest land to the 4-H Clubs of Tammany Parish, in the extreme southeastern portion of the State. One tract of 170 acres is enclosed by a 5 foot hog-proof fence, and contains 100,000 longleaf pine seedlings, planted by Mr. Thompson, and a good stand of young slash pine. The other of 255 acres of better drained soil contains slash and loblolly pines about 30 feet in height, which Mr. Thompson is having thinned. This area offers unusually good recreational facilities, and will be used for experimental, demonstration and educational purposes.

The Wickboxet Farms, Inc., of Rhode Island, have presented 270 acres to that State and 250 acres to Connecticut for State Forests. Provision has been made that the Rhode Island tract may be used for the State for breeding wild fowl and animal life, that it shall be open to the use of Brown

University and Rhode Island State College in connection with courses of forestry, to Boy Scouts for educational purposes, and to the U. S. Department of Agriculture for experiments looking toward restoration of chestnut trees; and the town of West Greenwich shall be compensated for the loss of taxable property by being permitted to obtain from the forest, for the cost of labor only, such wood as is needed by its schools. The tract in Connecticut will be added to the Pachaug State Forest, increasing its area to 9,253 acres.

STATE FOREST UNEMPLOYMENT RELIEF ACTIVITIES

(October 1, 1932 to January 16, 1933)

Total number of projects	86
Number of men given employment	1,823
Number of persons benefitted	6,617
Improvement cuttings, acres	2,288
Road improvements, miles	83
Boundary improvements, miles	52
Plantation improvements, acres	13
Trail improvements, miles	142
Telephone lines improved, miles	37
Free wood permits	1,667
Fuel wood cut, cords	12,336
Value of improvements to State Forests	\$20,584

PENNSYLVANIA'S WOOD CONSUMPTION AND GROWTH

FROM a recent publication "Reforestation Pennsylvania's Idle Land as a Self-Liquidating Public Work," compiled by E. A. Ziegler, Director of the Pennsylvania Forest Research Institute, the following is excerpted.

Normally Pennsylvania consumes about 1,900,000 board feet of lumber each year. She cuts within her borders less than one-sixth this quantity, and imports the rest, principally from the South and Pacific Coast. In addition almost our entire pole supply, and a large part of our railroad ties, mine timbers and pulp wood come from beyond our State borders. In normal years as much as \$100,000 worth of wood is bought outside the State by our people.

We have but a fraction of the standing growing timber we should have for self-support in Pennsylvania. Our forests should average 3,000 to 5,000 cubic feet of growing trees per acre. We have not over one-sixth of this. Our forests once

contained magnificent areas of pine and hemlock, so that three-fourths of our lumber cut was softwood—the structural timber most in demand. Now our second growth forests are 90 per cent. hardwood, including much cull material. Our structural lumber markets, our paper mills and our pole users call for hemlock, spruce and pine—and we do not have it.

Soft woods are not coming back naturally in our forests, which are changed by ax and fire to hardwoods.

Forest planting experience by the Pennsylvania Department of Forests and Waters over 25 years have demonstrated that it is cheaper to buy old abandoned fields and plant them to coniferous forest than to convert scrub hardwood to conifers by planting and repeated cutting back of competing hardwood sprouts. Pennsylvania needs more coniferous forest much more than the inferior hardwoods she is getting all too often by mere fire protection.

The freight saving of \$10.00 to \$15.00 per thousand board feet of lumber from the Pacific Coast will alone pay the cost of growing much of our own timber on our abandoned lands at home. Idaho white pine match stock costs \$19.58 freight per thousand board feet to a Pennsylvania match factory. This stock was once produced at home and can be again.

Artificial reforestation will give the State an opportunity to reduce this great deficiency of softwood timber in its forests. Old fields do better in coniferous trees than in broadleaf trees. Reforesting these 1,200,000 acres of idle land largely to conifers should add to our lumber cut upwards of 600 million feet annually—for all of which and much more we have a home market.

The above is but a portion quoted from the publication. In the foreword Hon. Lewis E. Staley, Secretary of the Department of Forests and Waters, says:

"It is not the intention to outline a future forest policy, but rather to call attention to the immediate need for the utilization of millions of acres of idle land in our Commonwealth so that they may yield their just share of taxes, provide a crop revenue, and furnish work for many of those who are unemployed.

"We have land enough in Pennsylvania adapted to forestry purposes to grow all the timber we need. It is essential to the best interests of our State and the welfare of our people that production be brought back on a sound basis. Economies, important as they are, will fail unless this is done."

Some of the giant redwoods have reached the age of 4,000 years and are often spoken of as the oldest living things in the world. Their span of life is unknown and authorities state that none of the big trees die a natural death.

They are immune from the attacks of fungus and insects, and do not die of disease or old age. Lightning, fire, wind or the axe seals their doom. Every giant tree if it lives long enough is almost certain to be struck by lightning and very frequently fire follows the lightning stroke.

"The Sequoia family is a Titan race, marked for death by violence. Only a forest tragedy keeps them from achieving the miracle of perpetual growth."—*New York Times*.

Trees have played a significant role in human affairs from the Tree of Knowledge down the path of ages. Shakespeare speaks of "tongues in trees" and their "whispering branches could relate many a tale." Old Testament narratives move four thousand years through the forests of Palestine and Absalom's locks "held him to a bough in Ephraim's Forest." The plane tree, of the buttonwood and sycamore family, is of remote origin. It was on this tree that the diminutive Zacchaeus climbed to see Jesus.

Xerxes had the replica of a beautiful sycamore reproduced in gold. The Greeks decorated sycamores with jewels and moistened the leaves with libations. Handel's "Largo" was composed beneath the shade of trees, and the fabled "Garden of Hesperides" had tree foliage. History relates they beautified Thebes, Babylon and Carthage more than three thousand years ago.

Whether considered from the utilitarian standpoint or viewed from the aesthetic angle, in summer leafage or winter grace silhouetted against a cold sky, trees are nature's outstanding contribution to mankind. They are crystallized symbols of the great miracle—growth. Trees "toil not, neither do they spin" but acorns turn to oaks and saplings become forest monarchs.—*L. A. Rushing*.

The customary illustrations in the centre of FOREST LEAVES are replaced by text in this issue. There were certain things we desired to relate at this time, others properly belong in this number.

It is suggested that readers who do not keep FOREST LEAVES pass it on to a library, a teacher, or a Scout.

THE IDLE LAND PROBLEM IN PENNSYLVANIA

By Charles R. Meek, Chief, Bureau of Forest Extension

THE area of Pennsylvania is 28,692,480 acres. Before the coming of the white man Nature had devoted nearly all of the land to the production of timber. Through the dense woods the Indians roamed and everywhere found an abundant supply of fuel, fish, and game.

The earliest white man no doubt lived much as did the Indians, by trapping and trading with but little attention to farming. There followed, however, those who hewed timber, built permanent homes, and cleared farms. For many years the clearing progressed, but not even a small percentage of the available surface land could be used.

Every Man a Farmer

Eventually there came a time when settlers had spread to all corners of the State. Nearly every head of a household was a farmer, raising most of his living on his own land and building his barns and fences from the lumber grown in the nearby forest. Later cities were springing up and food was very much in demand to feed those who did not raise their own crops.

It was believed by the early economists that the population, so limited by the area available for the production of food crops, was fast approaching the estimated possible maximum. It was predicted that every available surface acre would in time be needed for food production.

Heavy demands for other purposes also were made on the forests, and the trees were turned into lumber, as rapidly as possible, for building the factories and towns where the population was concentrating. It was not for many years later that anyone considered that the population might be dependent on other supplies also, and that provision would have to be made for them, too.

Water Supply Important

How astonished these old time prophets would be if they were to come back today and see even larger cities and a greater population, and in contradiction behold a rapidly dwindling farm acreage producing a more than adequate supply of food!

They would find that the people had awakened to the dependence of man upon wood also, that every effort is being made to increase wood production and put idle land to work growing timber. They would wag their heads indeed, when told that

people were not concerned with total food production but now believed that the population is limited by the available water supply.

A study of the decrease of areas tilled by the farmers uncovers an interesting situation. In 1900 there were 224,248 farms with an improved farm area of 13,209,183 acres in Pennsylvania. Although almost unbelievable, the census of 1920 shows that during those intervening twenty years the number of farms declined by 21,998 and the improved farm area decreased by 1,361,464 acres.

Marginal Farm Land

Between 1900 and 1920, though the total population was increasing, it was also concentrating in cities and towns and, in the ensuing rural competition, the marginal farm land was being forced out of production. Let us consider now what took place in the ten years between 1920 and 1930. The number of farms further decreased by 29,831, and the improved farm area diminished 1,360,663 acres more, with the rate of decrease at its height between 1923 and 1928.

Do we fully realize that within the past thirty years the number of farms has decreased by 51,829 and the improved farm acreage has declined 2,722,127 acres? Yes this is in Pennsylvania!

It is with these 2,722,127 acres and more, that we are concerned. What about them, and what are we going to do? The prosperity of our Commonwealth demands not only that we use them, but that we use them wisely.

Farm Land Classified

The 1930 census shows further the composition of the improved farm area:

Improved Farm Land	Acres
Crop land	7,813,826
Plowable pasture	1,779,305
Other land in farms, not woods (Roads, barnyards, orchards, etc.)	893,925
Total	10,487,056

There is also an item of 1,459,114 acres of "other pasture" but not woods, and apparently not included in the "improved" farm area total. Evidently the abandoned farm fields are not the only idle land problems.

When the agricultural income decreases the marginal land is increasingly difficult to farm at a profit, and becomes so costly to operate that it is abandoned. There is more of this marginal land that sooner or later is going to be crowded out of

the 7,813,826 acres of the "crop land" group into the "abandoned" farm land class. Also, without a doubt, some of the 1,779,305 acres will pass from the "plowable pasture" group into "waste" land. Already in the 893,925 acres in the "other land in farms" group we have an appreciable amount of waste land.

Vast Idle Area

We are profligate with the bounties that nature has given us. We boast of our twentieth century American efficiency! It is hard to realize how the State of Pennsylvania with 28,692,480 acres, and a population of over 9,600,000, dependent upon land for food and clothing, can afford to support such a vast acreage in idleness!

Estimating conservatively, and basing calculations on a comparison between reports given by the census for 1900 and 1930, we have in this State idle farm land approximately as follows: 2,720,000 acres of abandoned farm land, and 980,000 acres of unused land in the classifications "plowable pasture," "woodland pasture," "other pasture," and "other waste land."

Farm Woodlands

This total of 3,700,000 acres, however, does not tell the whole story. We have farm woodlands that comprise more than 4,000,000 acres, and it is estimated that 600,000 acres of these are so poorly stocked as to be producing little or nothing in the way of lumber. In addition, there are odd corners of "improved" land on the farm, such as steep banks and rocky outcrops, that, it is estimated, would add another 100,000 acres to the total; and there are probably 500,000 acres more of so-called forest, not in farm woodlands, that are not producing valuable products. Truly these 4,900,000 acres, or more than fifteen per cent of our State land area doing nothing to pay its keep and serve its owners, are impressive.

He would be a great man who could solve this problem quickly. He would also be rash, in these days, who would predict very far into the future. It behooves us, however, to give this land use problem serious consideration. From a forestry standpoint no forester would say that it must all be planted. Other economically practical land uses are recognized.

Idle Land a Liability

We do know that this 4,900,000 acres of land will be with us always. We cannot dispose of it; like one's face, no matter how homely, we must keep it. We know further that this land should

bear its share of the taxes, helping provide for the maintenance of schools and the building of roads. We know only too well that at present idle land is a liability and not an asset. Are we becoming land poor?

It is believed that there are uses to which this land can be put, no matter how humble, that will provide an income and make it an asset. What those wisest uses are, we must spend every energy to discover. It is rightly believed that the growing of forest products will play an important part in devoting the land to suitable purpose, and furthermore that the establishment of forests will be largely a tree planting proposition.

Stating the Problem

Let us, for a moment, ponder from the forestry standpoint what our problem is. Of the 2,722,127 acres of abandoned improved farm land let us estimate that 1,520,000 acres should grow forests, and the balance be set aside for other uses as economists may determine. Let us assume that the *idle* "plowable pasture" should be planted; let us include also *idle* "woodland pasture," more suitable for timber growing than cattle grazing; and to this we can add the *idle* "other pasture" that can be more efficiently devoted to tree growing. We will include also "other" *idle* land on the farms and the *idle* farm "corners." These total 980,000 acres.

We had estimated also 600,000 acres of farm woodlots and 500,000 acres of other forest land in need of planting, making an estimated total of 3,000,000 acres of idle land in Pennsylvania that should be planted with forest tree seedlings *now*.

A Tremendous Job

The problem is so vast and the figures so large that they cannot readily be grasped. If the total area that should be planted at *once* were estimated as low as 1,500,000 acres, the job is recognized as tremendous. Something practical must be *done*, and the sooner it is done, that much quicker will this land be helping to make life better for all of us. The need is urgent.

Assuming that these 1,500,000 acres could be purchased at an average price of \$5.00 an acre, we would have to set aside \$7,500,000 for land purchase. Assuming further that the land could be reforested for \$10.00 an acre, \$15,000,000 more would be needed, or a total of at least \$22,500,000, even to give the problem fair consideration. To plant the land at the rate of 10,000 acres a year, our present nursery stock production schedule would require 150 years! To increase the nursery

production schedule sufficiently to reforest ten times that amount, or 100,000 acres annually, would require fifteen years to plant one-half the land that must be reforested.

Reforestation Can Help

Let us not forget that unless conditions change the amount of idle land will increase each year, as farming is put on a more efficient basis, and as the marginal lands are eliminated. These abandoned lands reverting, in increasing amounts, to the counties for unpaid taxes already in some places impose an enormous tax burden on the still productive land. This cannot continue indefinitely. Reforestation is a part, and a large part, of the solution of the problem.—*The Service Letter*.

REPORT OF SECRETARY FOR 1932

THE development and progress of forestry and forest work, and associated activities, during the past year is naturally largely statistical, but the figures are impressive as showing the continued interest and work to restore and protect the rapidly depleting reserves of this important accessory to national activity.

The fiscal year of the Federal Department terminates June 30th, and that of the State on May 31st. Consequently some occurrences in the latter half of 1932 are not included in the following statements:

OCCURRENCES AND DISTRIBUTION OF FORESTS

There are now in the United States nearly 500,000,000 acres of forest land suitable for the production of commercial timber. About three-eighths of this bears saw timber, one-quarter cord wood, and the balance is in varying stages of immaturity and some is bare land. The total given above excludes about 100,000,000 acres of land wooded with such types of growth as to be commercially unusable, and 10,000,000 acres of good forest land withdrawn from timberage for recreation, scenic preservation or watershed protection.

Standing timber on the commercial forests is estimated at 487,000,000,000 cubic feet, not all profitably accessible, while the annual cut is one-thirtieth of this quantity. Because of the long interval demanded by nature between the seedling tree and its growth to timber size, the above fact remains as the principal argument for additional forestation. And it is also a justification for protection of standing trees from destruction by fire.

Forty-four per cent. of the saw timber is in the

west, and more than 70 per cent. of the eastern lands have not yet reached the timber stage of growth. Another regional contrast is that two-thirds of the western land is in public ownership, while of the eastern forests but four per cent. are so owned.

A division of the total shows 88,000,000 acres owned or managed by the Federal Government (75,000,000 being in the National Forests), 9,500,000 acres by the States, and over 1,000,000 acres by counties and municipalities, 127,000,000 acres in farm woodlands (mostly in the east), and 270,000,000 acres privately owned, mainly by lumber, pulp, mining, water and railroad companies. Public ownership of forests in this country is far below the practice in most European countries.

Soft woods comprise about nine-tenths of the saw timber, but hardwoods, which occur almost entirely in the east, furnish a quarter of the cut. Thus it is obvious that depletion of the hardwoods is progressing especially rapidly.

There exists, then, an unbalanced condition, not only in the geographic distribution as related to population and industry, but in respect to supply and demand of type of wood, of ownership and protection; and the situation is further affected by accessibility of tracts and such features as overcutting, denudation, type of replacement, erosion, understocking, damage by fire, insects and diseases, taxation and changing commercial and economic conditions.

NEW LEGISLATION

Legislation is requisite for large scale forestry and to protect existing tracts. The following new enactments have been effected:

In Georgia, the establishment of a Department of Forestry.

In Mississippi, optional county assessments for forest fire protection, and the establishment of a 23,000 acre University State Forest, also charging grand juries in respect to forest fire laws.

New York amended the laws to permit sale of forest products from State-owned lands, excluding the Adirondack and Catskill Parks. This State also voted a \$19,000,000 bond issue for forestry purchases and reforestation over an 11 year period.

Rhode Island instituted an inquiry as to lands available for State Forests, and provided for registration of saw mills and for notice of forest lands to be cut for other than domestic use.

Alabama specified penitentiary imprisonment of 1 to 5 years for wilfully or maliciously setting fire to trees of any age.

Virginia made liable for total fire fighting ex-

penditures those owners who permit land-clearing fires to spread, and to those who start forest fires.

Wisconsin appropriated \$500,000 for building roads, fire lanes and other fire protection measures by utilizing unemployed.

FEDERAL COOPERATIVE WORK

Under the Federal cooperation plan the National Government gave one and a third million dollars, the States over three and a quarter million and private agencies more than a million dollars for fire protection; and for distribution of forest planting stock the first two cooperating agencies expended nearly \$300,000.

Two hundred and twenty-eight million acres were under some sort of organized protection from fire, although this was but little more than half the area classed as needing fire protection. In the protected units nearly 62,000 fires burned more than six and a third million acres (of which two and a quarter million were classed as not of productive value). That is, one and a quarter per cent. of the productive acreage in the protective areas was burned. On unprotected lands over 45,000,000 acres were destroyed by fire.

The 38 cooperating States, with Hawaii and Puerto Rico, distributed more than 25,000,000 young forest trees, of which Pennsylvania furnished 6,000,000 and New York nearly 5,000,000, only six other States having supplied on a large scale. Also 32 States and two Territories cooperated in the forestry extension work of the Federal Service, the principal activities being the management of farm woodlands for increased return, planting trees on idle lands and education in forestry to rural school children.

NATIONAL FORESTS

Previously statement was made of the acreages of commercial forests and land for recreational and other uses which are under Federal ownership. These are a part of the total of over 161,000,000 acres of Government-owned lands in the National Forests, this total being almost 600,000 acres more than a year ago. Nearly 25,000,000 acres of land otherwise owned lie within the boundaries of the National Forests.

For administration, protection, improvement, reforestation and extension work, the total expenditures of the Federal Service were \$32,750,000. While this figure is impressive, it is more illuminating when expressed as 20 cents per acre for all purposes and activities, including a carry-over of \$4,260,000 for extra fire control expense incurred the previous year. The budget for this

year is greatly reduced and entirely eliminates funds for land purchases, but it does include continuation of blister rust control and special appropriations exceeding \$6,000,000 for emergency relief and construction work of such character as protects and benefits the wooded areas, and whose principal cost is for the labor of men.

The loss by 8,466 fires in the National Forests for the calendar year 1931 was but slightly above the average for the previous five years, but mention should be made that 1931 had 1,500 more fires which were man-made—an appalling figure. The result was that more than a half-million acres were burned over, 20 Forest Service employees lost their lives, property valued at \$3,652,000 was destroyed, and the expenditure for fighting exceeded \$4,000,000.

Active work was continued in protection against tree diseases and harmful insects, and nearly 27,000 acres in 24 States and Puerto Rico were planted with young trees, most of this being done by men needing work.

A lessened demand for lumber reduced the sales from National Forests nearly one-half, to 544,560,000 board feet. The economic conditions reduced the total receipts from National Forests more than half, but the aggregate was nearly \$2,300,000.

The National Forests now have nearly 33,000 miles of roads and 120,600 miles of trails. Visitors to these forests last year were estimated to exceed 32,000,000, an increase of 480,000 over the previous year; and estimates of wild life existing in these tracts give 1,200,000 of big game and 900,000 fur-bearing animals, with large numbers of game and other birds.

FORESTRY IN PENNSYLVANIA

For our own State we can best relate the situation by quoting from the last report of the Department of Forests and Waters: "The great Commonwealth of Pennsylvania, with an area of 28,692,000 acres, is carrying the enormous burden of one-sixth of its acreage virtually in idleness. Wise use is a part of sound conservation. The job of the Department, insofar as it is permitted by law, insofar as it is financially able, and insofar as the ability of its personnel permits, is to reduce wanton waste and build up the forest and water resources of the Commonwealth. The Department is sticking to that job." In our summary we shall cover only the work in forestry.

Following the extreme dry and disastrous season of 1930-31, the past fiscal year (ending May 31, 1932) showed a total of 3,806 forest fires which

burned 76,000 acres, with a damage loss exceeding \$200,000, and which cost \$125,000 to extinguish. Fortunately in the spring of 1931 considerable new and badly needed fire fighting equipment was obtained. Here it should be noted that the boys of Reading High School made, from wood supplied by the Department, 1,000 rakes as their contribution to forest protection. Six new steel observation towers were erected by the State and one by private funds, giving the State a total of 122 modern steel observation towers.

In the past year the Commonwealth started 69 prosecutions for violations of the forest protection law. Receipts for the extinction of forest fires, obtained from those responsible, totaled \$30,300 for the past two years.

Cooperating with the United States Bureau of Plant Industry the Department has attacked the White Pine Blister Rust, which has been found in 47 of our counties. As related in our last issue of FOREST LEAVES, this disease is attacked by *Ribes* plants which are alternate hosts of the blight. In 1931 over 829,000 of these plants were eliminated from 24,000 acres of State Forests, at an average cost of 42 cents per acre.

As much as possible work was given to relieve unemployment, by utilizing hand labor to clear out dead and defective trees, do improvement thinning, cut protective lanes and build roads and trails. In one State Forest 70 men were given work and 1,500 truck loads of wood donated to the needy, and additional benefits of this type have been given from other State forests, the total wood donated exceeding 9,000 cords.

TREE PLANTING

In 1931 605,300 trees were set out on 611 acres of State Forest land, and in the spring of 1932 1,147 acres were planted with 1,308,300 trees. The total to date on State land is over 41,228,300 set out in 1,609 plantations. The policy is not to plant trees where trees may be planted, but where they should be planted because of present low productivity of the soil. As an encouragement to restoring our wood resources the State grows in 45 acres of nurseries young trees which are distributed under specific conditions. Under the production plan 93 per cent. will be conifers, principally white, red and pitch pine and spruce, and the remainder of hardwoods, mainly red oak, black walnut, black locust, yellow poplar and white ash. Since 1910 nearly 106,000,000 trees have been furnished for planting on privately owned lands, of which over 15,000,000 were sent out in the last biennium. It is of interest to note that 4,200 in-

dividuals planted more than half of these trees. Water and power companies planted 1,374,500, other industrial organizations and other State and Federal lands each over a million, municipalities and counties 867,000 and associations and clubs planted 756,700 trees. As a result of this policy there are now in the State 100,000 acres of young forest lands in private ownership.

STATE FORESTS AND PARKS

As of June 1, 1932, the total area of State Forests was 1,566,033 acres in 36 counties, acquired at an average cost of \$2.42 per acre. Nearly a quarter of a million of this acreage was acquired in the past two years. From the sale of major forest products the State last year received nearly \$27,000. The last biennium has shown a 10 per cent. increase in the auxiliary forest reserves, which now total 45,878 acres.

In the same interval leasing of camp sites in State Forests produced nearly \$48,000, 2,600 leases having been made last year. Other types of leases brought a revenue of \$18,834.

The latest addition to our State Parks is the Roosevelt Memorial State Park, deeded to the State. This is a strip of 40 miles in length, adjoining and including the picturesque old Delaware Canal built in 1831. The immediate expense of repair and maintenance drew heavily on the \$50,000 which had been appropriated for State Parks, and some of the balance was transferred to relief work, hence no purchases were made.

There are now 9 State Parks, 9 State Forest Parks, 11 State Forest Monuments and 50 Public Camping Grounds in the State Forests. Last year, 4,000,000 people enjoyed the recreational, historic and scenic areas, and another million visited observation towers and hunted and fished within the State Forests.

The Pennsylvania Parks Association, whose interests and our own are closely related, has continued activities through the past year, and has experienced an increase in membership. Recently it prepared a film (35 mm.) on parks for loan to those interested, and which has already been in use. It shows what has been done in this State and some of the work in New York. Their and our energetic member, Mr. Thomas Liggett, has prepared a bill to be introduced in Harrisburg for setting up a State Park Fund. This bill provides that instead of all revenues going to the State and all expenditures being dependent on appropriations, that the revenue from these recreational and educational areas go to the State Parks fund for their direct maintenance and improvement. (This is similar to

the method under which the Game Commission operates.) The Park Association asks us to publish their request that those interested at once get in touch with their legislators on this matter.

OTHER ACTIVITIES

Cooperating with the Highway Department, the Department of Forests and Waters builds and maintains earth roads and trails in the State Forests. In the past two years there were added 256 miles of roads, bringing the total to 1,064 miles of road suitable for automobiles; and 530 miles of secondary roads and trails were built, raising the total of these to 4,586 miles. This work also aids direct employment of labor.

Informative and instructive pamphlets and leaflets were issued on fourteen subjects, and more than a half million copies distributed. A new recreational map was printed in 50,000 copies and 3 earlier maps were reprinted. There were also mimeographs of 39 leaflets on forest tree insects and diseases. A traveling exhibit and special motion picture reels carried the message of the Department to thousand of citizens. The *Forest Warden News* now has a quarterly circulation of 4,700 and the *Service Letter* of 600 weekly. The Pennsylvania Forest Research Institute, established at Mont Alto in 1930, continued its work on investigation, education and cooperation. Twelve pamphlets were issued on practical matters referring to forest products and use.

GAME COMMISSION

Not directly connected with but closely related to the Department of Forests and Waters is the Game Commission, which utilizes forested areas for game refuges and hunting areas. In the past year this Commission purchased 76,753 acres, bringing the total now owned to nearly a third of a million, and an additional 112,000 acres are under contract for purchase. Last year this Commission established 14 new refuges, making a total of 60 with a combined area of 85,500 acres. Twenty of these tracts are on State Forest lands, the remainder on land owned by the Game Commission, and in addition there are now 56 auxiliary refuges containing nearly 22,000 acres enclosed by wire. Fifteen of these are on State Forest lands, the remainder being under lease from private owners. Appreciating the loss of animals and their foods and habitats, as well as of trees, that result from forest fires, the Game Commission distributes annually 10,000 forest fire posters, and has instructed its employees to aid in preventing and suppressing forest fires. Additional work in

conservation and wild life is carried on by lectures and motion pictures, which last year were attended by a quarter million people.

PENNSYLVANIA FORESTRY ASSOCIATION

In the cause and progress of forestry this Association has constantly contributed for more than forty years. If asked how to describe our activities the reply would be that our work was educational, informative, helpful and cooperative. During the year we have been particularly active in diffusing information regarding the necessity of adequate forest fire protection, so that the investment which the citizens now have in existing forests be not more seriously damaged. Other matters such as utilization of tax-sale lands, distribution of trees, new plantings, and encouragement of a movement for local forests are among our recent activities. Nor must there be omitted the efforts now in progress to save and maintain the few remnants of our old virgin forests. We have referred above to the cooperation given by the Department of Forests and Waters in aiding employment by constructive and improving work in the State Forests. This practical type of augmenting employment has been consistently fostered by this Association. Not only have conferences been held with the Governor and Department heads, but letters were written to each of the legislators, calling to their attention this direct method of relief.

Our work has been carried on with thinned ranks, the past year having taken an unusually high toll of our members, many of whom had been active since the Association's youth. The others carry on, being heartened by a recognition of the growing appreciation of and interest in forestry. Our organization is independent and uses only direct means; yet we know by comments and letters that our interest and desire to help have been recognized and appreciated. Also we have been told that our work is not yet done, and that our aid and cooperation is further needed to "Restore Penn's Woods." To give our cooperation we must have that of others, and the more who help the more we can do.

C. P. BIRKINBINE,
Secretary.

The total area of the 64 forest reserves on the five main islands of the Hawaiian group exceeds a million acres, of which two-thirds is owned by the Territory. Last year, in addition to regular activities, a George Washington Memorial Grove was dedicated, and a reclamation project of planting 20,000 trees in shifting soil was completed.

A VISIT TO THE FOREST MONARCHS ON EAST TIONESTA CREEK

By Edward C. M. Richards

ON the morning of October 16th there assembled at Sheffield, in Warren County, Pennsylvania, a group of the officers and members of the Pennsylvania Forestry Association, together with a number of technical foresters and other interested individuals, for the purpose of visiting what is today the largest solid body of original growth, virgin forest still remaining untouched in the Commonwealth. The party was made up of the following:

Mr. Samuel L. Smedley, President of the Association.

Mr. Edward Woolman, Vice-President of the Association.

Mr. Francis R. Cope, Jr., of Dimock, Pa., Vice-President of the Association.

Dr. Edward Wildman, of Philadelphia, member of the Council of the Association.

Mr. Herman Cope, of Media, Pa., member of the Council of the Association.

Mr. Charles F. Jenkins, of Germantown, Pa.

Miss Cope, of Dimock, Pa., and her friend, Miss Hadley.

Director R. D. Forbes, of the Allegheny Forest Experiment Station, U. S. Forest Service, Philadelphia, Pa.

Mr. A. F. Hough, Assistant Silviculturist attached to the Station.

Mr. L. L. Bishop, of Warren, Pa., Supervisor of the Allegheny National Forest.

Mr. Charles S. Knapp, Superintendent of Schools of Warren County.

Mr. Edward C. M. Richards, of West Chester, Pa., Consulting Forester.

The purpose of the visit to this beautiful remnant of Penn's Woods is of special interest to not only technical foresters and those concerned with the furthering of the practice of forestry in our country, but also to those who treasure beautiful things in nature and who wish to see the glories of our national inheritance preserved permanently for posterity for artistic and recreational reasons. It had been suggested that as the year 1932 was the 250th anniversary of the coming of William Penn to Pennsylvania, it would be most fitting to set aside 250 acres of virgin forest which is the only part of our Commonwealth still existing in just the same condition as when Penn landed, as a memorial to the great Quaker leader. This small tract would be set aside permanently so

that nothing would be allowed to interfere with the action of natural forces operating within it, and the area would in this manner afford not only a glimpse of what the original Pennsylvania forests were like, but would also furnish a very valuable experimental area for the study of various phases of forest growth by the Allegheny Forest Experiment Station. Such scientific data would be of great value in the future in working out many fundamental problems dealing with the technical practice of growing forests in this part of the United States.

On alighting from the sleeper those who came to Sheffield by train were greeted by Mr. A. F. Hough, representing the local staff of the Allegheny Forest Experiment Station, and after leaving the handbags, extra coats, and other impedimenta at a nearby hotel, all wended their way to a near-by restaurant for breakfast. As large quantities of fruit, cereal, eggs, hot cakes and coffee appeared and disappeared with equal rapidity, various other members of the party who had come by auto, joined the group, turning the early morning repast into a very enjoyable get-together which augured well for the pleasure of the excursion. And finally as the group came out of the restaurant and prepared to embark in the autos which had been assembled for the trip, the rising sun gave ample assurance that a perfect October day was being furnished for the expedition.

Driving south out of Sheffield on Route 666 the party passed thru the town of Donaldson after a short run, and a couple of miles further on turned sharply off the hard State road on to a road which runs up the east branch of Tionesta Creek into the edge of the virgin timber. This branch road was entirely free from all inhibitions of any kind whatsoever. When it wished to turn, it turned, and when it wished to hollow itself into a nice big mudhole full of water, it did just that. Also this road showed its fine contempt for all modern developments by maintaining a surface quite unsuited to auto tires. In fact, this mile or so of road was most refreshing after the dull monotony of asphalt and concrete, and contributed more than its share to the humor and wise-cracks of the day. And as a first step back into the past, it fitted in beautifully with the scheme of things, for it reminded us of Pennsylvania in 1900, and following it we came into Pennsylvania of 1682 and earlier.

Having driven the autos as far as possible along the dirt road paralleling the creek, and crossing one of the logging tramroads belonging to the Central Pennsylvania Lumber Company—the

owners of the virgin tract—which runs up the creek into the timber, the party finally were forced to proceed on foot, up the tramroad to a log landing. Here we had our first close-up glimpse of what big Pennsylvania hemlock and birch and beech timber looked like. Lying in close ranks along the track were a large number of logs waiting for the loader to come and put them on the logging railroad cars for transportation to the sawmill in Sheffield. These logs instantly made one particular impression upon us. This impression was of their very large size, both in diameter and in length, altho there was little regularity among them. In addition the nice, freshly cut ends of the logs were such a temptation to those who wished to count rings, that some minutes were spent in this occupation, the results showing that most of the logs were well over 100 years old.

On the advice of a watchman at the loading place, the party left the tramroad and started right up the steep hillside toward the plateau lying to the south. This move put us into the fresh cutting area of the logging operation at first and, as we moved on, into the edge of the virgin timber area itself.

The virgin timber on the Tionesta tract is, for the most part, a piece of hemlock forest. That is, most of the trees are hemlock with now and then a beech, a birch, a hard maple or, more rarely, a tulip popular or a wild black cherry. While these minor species are present, however, the forest can fairly be called a hemlock forest, for practically all of the main stand is composed of that kind of tree. The most striking thing about this forest, of course, is not its composition, but its size, for these trees are giants, both in size and also in age. For instance, the following figures of diameter outside the bark at breast height will be of interest. A hemlock of 46 inches; a black cherry of 38 inches; another of 39 inches; a white ash of 37 inches; another hemlock of 53 inches; a cucumber tree of 45 inches. As for heights, a tree 100 feet high excited no comment at all, and some of the tallest specimens went up 120 to 130 feet to the tip. Just what the maximum dimensions will prove to be after a careful study is made of the forest nobody knows, but quite evidently we can expect something big.

In general the forest is fairly well limited to the main stand of great old, veterans which form nearly a complete canopy high overhead, and a relatively unimportant growth of young trees of the same species beneath, mixed in with shade-bearing shrubs and bushes of various sorts. A surprising amount of fine young hemlock young growth

is often present, but there is rarely if ever any intermediate stand of trees ten to twelve inches or thereabouts in size. This arrangement results in a very beautiful, cathedral-like forest with lacy evergreens on the ground below and a glorious play of spots of sunlight coming thru the great crowns of the upper story high overhead. The appearance is quite different from the famous Heart's Content forest which is located some 20 odd miles away to the southwest. The Heart's Content forest is strikingly two storied, the upper story being huge white pines, pretty much all of one age, while underneath this is a secondary stand of medium sized trees of hemlock. Here in Tionesta the hemlock reigns supreme, with clear, cylindrical stems often running up for forty or fifty feet without a limb. And gazing at these old trees of Penn's Woods an interesting fact came out. In the case of the hemlock the bole of the tree tends to hold its size far up into the limby crown, and then suddenly as it nears the top of the tree, the bole tapers off abruptly. So sharply does this taper in the top come that one is reminded of the sudden cone-taper of a freshly sharpened lead pencil.

Climbing slowly thru this lovely relic of original forest the party made the most of the opportunity to photograph especially attractive spots and to drink in the loveliness of the surroundings. Following at first the cleared pipe line, which carries oil from some of the wells nearby, thru part of this tract, and later on following some of the woods-roads, the members enjoyed the forest, the bright cloudless day, and each other immensely, and when at noon we all sat down for lunch it was quite evident that everyone was strongly impressed with the advisability of trying to bring a goodly portion of this piece of virgin timber into the permanent ownership and control of the Federal Government.

Both from the standpoint of a research laboratory for the Forest Experiment Station and also as National Park and recreation area, the value of this forest appealed strongly. Representing as it does a small piece of what Pennsylvania looked like when the Founder of the Commonwealth landed two hundred and fifty years ago, the importance to setting a goodly piece of it aside for historical and recreational, as well as scientific reasons, was discussed from various angles, and the work of the committee, headed by Mr. Francis Cope, aiming to bring this about, was warmly approved. To permit the ruthless cutting and destruction of this wonderful relic of primitive Pennsylvania would be a shame, and when it is remembered that once this forest is cut, it will be gone forever, the need for action to save it becomes apparent.

After lunch some of the party continued their tramp over part of the top of the plateau where the noon halt had been made, finding a section of the forest where, for various reasons, such as the presence of some promising young growth already well started, replacing some of the older trees which were falling behind, and so giving special promise of a continued maintenance of the forest pretty much in its present condition for many generations to come. Perhaps it will be wisest to consider this part of the tract in particular when the time comes for making a selection of the areas to be bought and set aside.

It was also noted by all of the party that no signs of either cutting or of fire were found during the day's walk. In fact, except for the trimmed out pipe line and the few winding woods roads no sign of human presence was to be seen at all, a fact worth special consideration in these days of ever expanding civilization. The fact that here was a piece of absolutely untouched wilderness right in our Commonwealth brought home to us all the opportunity now being presented to the Pennsylvania Forestry Association to do what it can to assist Mr. Cope's Committee in the task of raising funds for the purchase of a large piece of this forest for the benefit of future citizens not only of Pennsylvania, but also of all the eastern United States.

And so it was with gratitude and determination that the party retraced its steps in the glow of the afternoon. The peaceful silence and charm of the great forest had fitted in perfectly with the Sabbath Day's journey, and with the memory of the great Quaker Founder, and we were grateful for this silence and charm and peace. And along with it was the determination to do our part toward saving this precious remnant of Penn's Woods for our Commonwealth and our Country for all time.

Subsequent to our Annual Meeting, the *Public Ledger* printed an editorial on December 14th titled "Saving the Trees." This said: "Pennsylvania's bill for fighting forest fires during the year ending last May 31st, as cited by the Pennsylvania Forestry Association, was \$125,000. This means that protection for the State forests costs about seven cents an acre. Few States in the country can show a better record. Nor can many States show a lower fire loss for the year, reckoned either in dollars or acres burned over. Approximately 76,000 acres were burned, at an estimated loss of \$200,000.

DEPARTMENT OF FORESTRY
STATE COLLEGE

PA.

FOREST LEAVES

APRIL, 1933



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PENNSYLVANIA FORESTRY ASSOCIATION
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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 306 Commercial Trust Building, Philadelphia.

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EDITORIAL

THE recent creation of the Civilian Conservation Corps, by Federal enactment, has called attention to the potentialities in forest lands even before the stands have achieved timber maturity. It also calls attention to the large amount of essential work, for the benefit and protection of the forests, which is to be done. This emphasizes the fact that practical forestry does not consist merely of planting trees, or of only buying wooded areas; it includes such studies and actions as will assure the highest return for the time and money expended. Forests are an essential part of our economic life, and although forestry has not yet reached, and has still far to go, to attain the stage where natural increase compensates for destruction, its importance continues to grow in the public mind. To foster such growth was and is the reason for such organizations as ours.

There are but 67 county treasurers in the State. As much of the monies they receive comes to them through collectors of political sub-divisions, they are not known by most of the people. But it would be instructive to our readers to call on the county treasurer and learn how many parcels of tax delinquent land have been offered for sale year after year, with no bidders, the taxes and penalties continuing to accumulate until offering them for sale again is nothing more than compliance with a statute. And year after year such lands lie idle and yield nothing toward the maintenance of the county or the State. He would then appreciate why this Association worked upon and worked for what is now House Bill 1500.

The suggestion of one of our members, that the type in FOREST LEAVES be larger, was adopted after discussion with the Council. An-

other change has been made by inserting photographs in the text of the particular article.

Through the interest of our active members, this Association has offered the free use, for camps for employment relief, of two tracts in the central portion of the State. The use of existing buildings and ponds is included, and also cooperative work for recreation and education during leisure periods. While it is most likely that these tracts, if accepted, would be used by work units employed on State lands, this is not specified, the purpose being to aid relief work and furnish healthful surroundings.

Workers in and friends of forestry are cognizant of the serious damage to tree growth from harmful insects and diseases, especially alien ones for which Nature has no check in new territory. This issue we include a paper on the very destructive Gipsy Moth, to help owners preserve their and the adjoining trees. As Mr. Ziegler has said, the Forest Research Bureau at Mont Alto is always ready to cooperate with the citizens of the State in determining tree injuries and informing on preventive and protective measures.

Through the cooperation of one of our active members, a tree has been offered to each school in the immediate vicinity which wishes one to plant on Arbor Day, April 21st. No doubt there are others who can similarly foster such work in their communities.

Cherry is the principal lumber used in backing blocks for electrotypes, halftones and zinc etchings. It excels for this purpose because it works easily into the fine dimensions required and shows practically no dimensional changes with variations in humidity. Nearly three million feet of cherry lumber are consumed annually in the photo-engraving industry.

1933 SPRING ARBOR DAY PROCLAMATION

In the Name and by Authority of the Commonwealth of Pennsylvania, Governor's Office

Proclamation

I, GIFFORD PINCHOT, Governor of Pennsylvania, do hereby designate and proclaim Friday, April 7, and Friday, April 21, as Spring Arbor and Bird Days, to be observed generally throughout the Commonwealth by the planting and conservation of trees and the study and preservation of bird life.

When William Penn first set foot on American soil, Pennsylvania was covered with one of the finest stands of timber in existence. Now, after two hundred and fifty years, less than twenty thousand of the twenty-eight million acres of original forest remain. Approximately four million acres of land now stand idle, cast off as unproductive during the last half-century. So, too, our birds and other wild life have been threatened with extinction until for years their protection by law has been necessary.

Trees are among God's most generous gifts to mankind. Their abundance insures a haven for birds, natural guardians of our fields and forest crops. The economic progress and future welfare of Pennsylvania are dependent, to a greater extent than many of us realize, upon the solution of how to place under production our huge acreage of denuded forest land and submarginal farm land.

Therefore, I call upon every citizen, and particularly every teacher and school boy and girl, to give serious thought to the real significance of Arbor and Bird Days, and to turn this thought into action. Let every community enlarge the number of its trees, and where feasible, carry forward some reforestation project that will reduce this vast acreage of unproductive lands. Planting trees and reforesting idle lands will not only afford unemployment relief, now so vital, but will provide future generations with those things which are

held to be essential to their health and happiness.

GIVEN under my hand and the Great Seal of the Commonwealth, at the City of Harrisburg, this twenty-seventh day of March, in the year of our Lord one thousand nine hundred and thirty-three, and of the Commonwealth the one hundred and fifty-seventh.

GIFFORD PINCHOT.

By the Governor:

RICHARD J. BEAMISH,
Secretary of the Commonwealth.

"The forest problem ranks as one of our major national problems."

"More than 50,000,000 acres of agricultural land, originally timbered, have been abandoned because they were never suited to agriculture or because they have reached the submarginal class from erosion or other causes. The land is now idle and available for forestry. The area may become larger in the future."

HENRY A. WALLACE,
Secretary of Agriculture.

"Our forests time and again have contributed to the solution of important national economic problems. They were the first and greatest natural resource to be drawn upon when the American colonies were established. They contributed to the rapid development of the pioneer West, and their wealth went into the building of cities, railroads and farmsteads. Timber from America's forests played no small part in winning the World War. Now the forests are being called upon to help meet a national peace time emergency."

R. Y. STUART,
Chief Forester.

The three nurseries of Puerto Rico are now producing about 2,000,000 trees yearly, for use on a half million acres of denuded land not used for agriculture, the trees being both native and exotic. Climatic conditions on the island are unusually favorable for rapid growth, and the demand for trees exceeds the available supply.



Courtesy Department of Forests and Waters.
AN IMPROVEMENT CUTTING OPERATION BY UNEMPLOYED WORKERS IN THE PENN STATE FOREST, CENTER COUNTY.

JOBS FOR THE JOBLESS: FIREWOOD FOR THE NEEDY

By John W. Keller, Deputy Secretary, Department of Forests and Waters

THE forests of Pennsylvania, both State and privately owned, have played an important part in relieving want and unemployment during the present depression. The two greatest contributions made by the woodlands of the State were in the form of fuel and work.

During the past year some 100 emergency relief projects, employing more than 2,000 men, were conducted in the State Forests. The men were usually employed for periods of from three to five days a week under a stagger system whereby different crews alternated weekly in order to furnish work to the greatest number of worthy applicants.

In practically all cases the labor was furnished under the direction of local welfare agencies and the supervision was provided by

the State foresters and forest rangers. Most of the emergency employes were given food orders for their services, though a few in some localities were paid direct for their work. It is estimated that approximately 8,000 persons were benefited directly or indirectly by the work provided in the State Forests.

The activities were principally in the form of improvement cuttings in the State Forests along highways, and in the various State Forest parks, monuments, public camps, and plantations. The areas improved by these cuttings aggregate some 10,000 acres. Roads, trails, and boundary and telephone lines, improved, repaired, and brushed out totalled some 300 miles.

More than 2,000 free fuelwood permits were issued, which will result in at least 28,000 cords having been cut by the beginning of summer. The value of these improvements to the State Forests during the past year is estimated at \$25,000.

When we realize that these activities are exclusive of employment given to forest fire

fighters and regular salaried personnel, we appreciate the fact that the State Forests have contributed greatly to alleviating the suffering caused by lack of fuel and employment, particularly in the mountainous sections of the State, where, although the population is thin, the want is nevertheless as acute as in urban and metropolitan sections.

Recent data to show the extent of the relief contributed by the privately owned timberlands in the State are not available, but from reports received from many sections it is believed that the accomplishments in the State Forests have been duplicated many times in the privately owned woodlands. In short, the forests of our State have helped materially to meet the problems and demands resulting from the depression.

Another interesting angle to the forest situation as it affects the economic and social welfare of our people arose from the greatly stimulated use of wood for fuel. During the past two winters more firewood has been consumed in Pennsylvania than at any time since the World War. Businesses have been built up from the sale of firewood—not fireplace wood which may be considered a luxury—but firewood for the kitchen range, the living room stove, and the furnace. This firewood is playing a very important part in Pennsylvania forestry because the 1,240,000 cords cut from Pennsylvania's woodlands during the past year should result in a marked improvement in the quality of the remaining stand, since ordinarily only dead and defective trees are felled for fuel. Pennsylvania foresters estimate that 268,000 acres of privately owned woodland have been benefited by fuelwood cutting in the past year.

Wood is considerably cheaper than oil, gas, electricity, or coal and its increasing use is indicated by the enormous quantities one may see being transported over the highways. A decade ago one could drive the length and breadth of the Commonwealth without seeing much firewood being transported. Today an observing motorist may find all classes of vehicles, from sedans to express wagons, loaded with firewood for the city, town, and village as well as for the country.

While ordinarily fuelwood permits are issued for cutting trees in the State Forests only when the permittee agrees to pay for the timber, the Department early in the depression granted free fuelwood permits to indigent persons who were without funds to purchase their winter fuel supplies. The material cut was either dead or defective, and because these cuttings were done under the strict supervision of State forestry officials the timber stands were actually benefited by this culling process.

District Forester Thomas C. Harbeson, of Milroy, issued several hundred permits under which the cutting of fuelwood resulted in an improvement to some 1,000 acres of the Penn State Forest. In this district, as in many others, jobless men cut the wood and local poor boards provided the transportation for the workmen and the wood they cut.

More than 1,800 cords were removed from the Susquehannock State Forest, particularly from the tracts bordering the Coudersport-Jersey Shore Pike and along the new Rock Ridge State Forest Road, under permits issued by District Forester Harry E. Elliott, of Coudersport.

Extensive wood cutting operations, sponsored by the American Legion of Waynesboro, have been carried on in the Mont Alto State Forest. The workmen spent three days each week in the mountains cutting the wood; the remaining three days were spent in hauling it to town where it was sawed without cost and distributed to needy families. Food for the men was prepared in the Legion home and hauled by truck to the forest operations. District Forester W. L. Byers, of Mont Alto, in February had arranged through local welfare agencies to obtain the services of 100 men per week for working on State Forest road projects. Considerably more than 5,000 cords of dead wood were removed from this forest during the past winter.

In the Tuscarora State Forest in Cumberland and Perry Counties several hundred cords of dead wood were cut along State Forest roads under the supervision of District Forester B. D. McPherson, of Blain. Local welfare organizations then distributed the wood to needy families in these counties.



Courtesy Department of Forests and Waters.
A POWER SAW IN OPERATION CUTTING UP FIREWOOD INTO STOVE LENGTHS.

Some of the most extensive of the forest welfare activities have been undertaken in the Bald Eagle State Forest under the supervision of District Forester Raymond B. Winter, of Mifflinburg. For several months during the past winter the labor force has varied from 100 to 300 men. In this district, in addition to cutting free fuelwood, many miles of State Forest boundary lines, roads, and telephone lines have been repaired.

In the Sprout State Forest unemployment relief projects have given work to more than 600 men, resulting in close to 5,000 cords of wood being cut and distributed to needy families, according to Charles Hogeland, District Forester of Renovo.

District Forester John R. Williams, Fayetteville, reports that more than 300 men were employed in the Michaux State Forest and that wood permits were issued for about 4,000 cords of fuelwood.

These examples do not by any means exhaust the list of State Forest unemployment relief projects carried on during the past year. Practically all of the 24 State Forest districts

utilized the unemployed in some form or other and contributed to the demand for firewood. In some of the State Forest districts where State Forest land was either absent or not adapted for unemployment activities, the State foresters were successful in placing unemployment workers on improvement jobs in privately owned woodlands.

Thus it will be seen that the relief work in the Pennsylvania State Forests made necessary by the depression has served a two-fold purpose: first, by giving healthy worth-while work to the jobless and, second, by accomplishing needed improvements in our woodlands.

Planting on the formerly treeless prairies of Western Canada has been under way since 1901, a total of 117,000,000 trees having been distributed for this purpose by the Canadian Government, of which 4,000,000 were sent out in 1932, mainly for windbreaks. The Canadian National Railways carried out a similar plan in many parts of the country, using the trees both for decorative purposes at stations and in place of snow fences.



SUGGESTION FOR 1933 SUMMER MEETING

THE Spring Arbor and Bird Day Proclamation of Governor Pinchot, printed in this issue, mentions how little is left of our virgin forested areas. This was ably presented at our Annual Luncheon Meeting last December by Vice-President Cope, and his talk has been given a special chapter in "Penn's Woods—1862-1932." A view taken in one of these remaining stands is shown on the cover.

It has been suggested that this year's Summer Meeting be made one to particularly view one or more of these tracts. All these remnants of former grandeur are somewhat remote from the homes of the majority of our members, the attendance would therefore be dependent upon the presence of members living in the vicinity and the number of our members in the eastern portion of the State who would make the trip.

The committee has initiated preliminary inquiries as to the availability of existing camps, rather than hotels. But as the project is dependent upon attendance, we should welcome and appreciate early comments from our members as to their own views and expectations of attendance. A successful meeting gratifies everyone, and we ask your aid in having one. A note to the secretary will be turned over to the committee for its guidance.

HOUSE BILL 1500

BOTH the House of Representatives and the Senate of the State have passed House Bill 1500, introduced on March 14th by Hon. P. B. Rice, a friend of forestry and of conservation. The original draft was compiled by a committee of this Association, who gave much time and thought to the provisions and who gave additional time to conferences so that it would be a well-drawn and helpful measure and of benefit to the State. Because the provisions will further three distinct situations, which now lag to deter our economic progress, the bill merits the consideration and help of our members and friends. These items are:

Removing tax delinquent lands from the present "No Man's Land" to a position where these will produce revenue and become an asset.

Reclaiming lands in the State now idle.

Establishing more forest plantations.

The bill asks for no appropriation, nor does it include mandatory provisions which would entail expenditures. It is enabling legislation. Nor does it withdraw the existing rights of owners to repurchase tax delinquent land within two years. Further, choice and selectivity are provided for, and action, under provisions of the bill, will be voluntary. Briefly, it would permit:

Acquisition of tax delinquent lands by counties for:

County Forests, to be owned and operated by the county:

Or, sale by the county to the Department of Forests and Waters or to the Game Commission of Pennsylvania, if these departments desire the lands and can purchase them at an agreed price, which can not exceed certain specified low cost per acre:

Or, transfer to the Department of Forests and Waters, if this department and the county both so desire, for use as State Forests; in which event, when the crop is marketed, the county will receive a stated percentage of the profits.

At present tax delinquent lands bring no revenue to the county, and each year hundreds

of thousands of acres are offered for sale, with no bidders. The bill provides:

That when a county retains lands for county forests, both the township and the school district in which the lands are located shall each receive each year two cents per acre for road and school purposes;

And that, as is now the case in respect to State Forests, if the Department of Forests and Waters accept such lands for State Forests, the State shall pay to the county each year, five cents per acre for county, road and school purposes.

As in the past, this Association presented their case to the Legislators entirely on its merits as a conservation measure, and we have just learned, on going to press, that the bill has been signed by the Governor.

RECENT FEDERAL ACTION

I PROPOSE to create a civilian conservation corps, to be used in simple work, confining itself to forestry, the prevention of soil erosion, flood control and similar projects. . . . This type of work is of definite, practical value as a means of creating future national wealth. . . . This enterprise will pay dividends to the present and future generations. . . . More important will be the moral and spiritual value of such work."

FRANKLIN D. ROOSEVELT,
President.

"In general four kinds of jobs need doing. One involves protecting our forests against fire. Another involves the unending fight against the insects and diseases that attack trees, and cause so gigantic a loss. A third job involves flood control, and the prevention of soil erosion. The fourth kind of job has to do with making our forests more productive.

"As the forests have grown, without interference from man, the young trees on hundreds of thousands of acres have formed thickets so dense that the competition for moisture and sunlight has seriously retarded growth. Undernourished and defective trees have prevented sound young trees from progressing at their normal rate. One job, then, is to thin out the

undesirable trees, and in various other ways to provide the conditions necessary if the forest is to mature a valuable crop of timber, permit recreation, and remain a great national resource.

"Perhaps one of the most urgent jobs of all is to protect our forests from fire. We can not prevent all forest fires, but we can prevent some of them. Those that do start, can, by wise use of the forester's art, be kept down to a minimum of damage. We can get rid of the dead standing trees, and the inflammable debris that presents a constant fire hazard. We can build new roads and trails, which will enable our forest fire-fighters to fight more successfully. We can install new fire guard stations, new lookout posts on high ridges, necessary telephone lines and emergency landing fields for airplanes. We can do these and many other essential jobs, to protect a cherished national asset.

"The men will be able to do yeoman service in waging battle on the costly insects and diseases that damage forest trees. There is the all too famous gypsy moth to fight in New England's forests, and the western pine beetle to battle out West. By routing out some of these plant enemies entirely, by checking the spread and the damage of others, we shall preserve intact our investment in the forests.

"Finally, there is work to be done to prevent soil erosion and to forestall, if possible, disastrous floods. On the watersheds of many of our rivers serious soil erosion has been caused by the removal of the protective cover, the invaluable vegetative sponge. Heavy rains, unchecked, have gouged ugly gullies, have taken down to the rivers countless tons of fertile soil, have left both a soil and a flood problem in their wake. We shall have to build what are called check dams in the deeply eroded gullies, and plant bare hillsides with brush and trees to hold the soil in place. Elsewhere, the job will be to plant trees to replace those that have been cut or lost by fire, and to plant trees on lands which nature always intended for the growing of trees."

HENRY A. WALLACE,
Secretary of Agriculture.

"We shall be accomplishing some enormously important public work—work much needed for the protection and improvement of our forests. We shall be developing and safeguarding a vital national resource, building for future national wealth. . . . The labor performed in the forests will render a great public service by helping to put the forests in a productive condition which would have taken decades to attain under ordinary circumstances. It will help to check the huge losses we now sustain each year from fires and floods. It is work that should eventually yield direct and indirect benefits to the Nation far beyond its present cost."

R. Y. STUART,
Chief Forester.

Work contemplated on the national forests will be in line with existing long-term plans for the development and protection of the forest resources, and hence will not include any "made work," intended merely to keep men busy. The plan will mean a vast speeding up of an established national forest improvement program. The forestry work will include control of tree diseases and insects.

The act authorizing the unemployment relief program provides for work on State-owned forest lands as well as on Federal-owned. A conference with State foresters was held in Washington on April 6th, on plans for the execution of the program on State lands.

As amended, the act also provides for extension of forest work to privately owned lands under cooperative arrangements to be made by the Federal Government with the States. This will allow a larger proportion of the work to be carried on in States east of the Mississippi, where only a small portion of the total area of National Forests is located and the area of State Forests is limited. Work on private lands, it is pointed out, will be limited to the classes of projects already authorized by Congress which are clearly in the public interest, rather than chiefly beneficial to the landowner. Such projects include protection from fire, insect control, and eradication of tree diseases. Due to lack of available planting stock, forest planting will necessarily be limited this season.

In this State lies the Allegheny National Forest of 350,000 acres, and plans have already been made for utilizing a number of men in five camps in this forest.

In the State Forests, as related in this issue, the State, and the State cooperating with local welfare agencies, have been doing such helpful work to the full extent possible by available funds. The Department of Forests and Waters has had completed for a year, plans for a greatly enlarged program, which can be made effective as soon as funds or labor can be obtained. Secretary Staley has stated that the State Forests of more than 1,500,000 acres can furnish 3,000,000 days of work, and can usefully employ up to 25,000 men.

FORESTRY AND THE USE OF FUEL WOOD

By Henry I. Baldwin, Ph.D., Pennsylvania State Forest School

IT IS a well-known fact that attention was first drawn to the production of wood crops by a localized fuel shortage during the late Middle Ages. Since then we have gradually moved away from the use of wood for fuel. Coal was discovered, then oil, and transportation improved so that both could be sent cheaply to all parts of the world. Recently gas and even electricity have entered the field as heating agents. In fact on farms, where the use of wood for fuel has been most general, coal and oil have frequently been substituted. Oil burners are now being used in country kitchen ranges in many of the most heavily forested parts of the country.

Not only did forestry have its beginnings in a fuel wood famine, but it still finds best conditions for intensive practice in places where fuels other than wood are relatively scarce or high in price. Thus Sweden, with almost no coal, burns wood almost exclusively, and this in no small degree makes possible utilization of lower quality forest products and the rational tending of the forest. The coal and oil resources of central Europe are inadequate to interfere with a very general use of wood for fuel. England, on the other hand, has tended her coal fires instead of her forests.

Silviculture, like agriculture, postulates the growing of valuable crops rather than weeds. In agriculture, due to the relatively small areas in one crop, smooth land, or both, hand or machine cultivation can effectively dispense with weeds. The weeds are not utilized; they are removed at an expense chargeable against the growing of the crop. When the crop is harvested the whole plant cannot always be used, but often is. In forestry direct expenditures for growing crops must be kept at a minimum; weed species and unutilized parts of crop trees must be disposed of by some very cheap method, if at all. By far the most satisfactory would be their complete removal from the forest. Where fuel wood can be removed to at least pay the cost, great possibilities for forest improvement by thinnings, etc., are opened up. Acid wood formed a valuable outlet for much poor quality wood before the curtailment of the industry following the discovery of synthetic methanol, which made the wood distillation process more expensive in comparison. The alternatives of utilization are girdling, or cutting and leaving in the woods, both of which require a direct outlay without immediate return. Our forests have been so deteriorated in quality by two centuries of culling out always the best trees that we now have a local shortage of high quality timber coincident with a tremendous over-supply of low grade material. Some way must be found to move the latter if our forests are to be restored to full productivity.

A return to a wider use of wood for fuel is the most logical and economic step that can be made both for forestry and for the benefit of the consumer. It should begin at home, on the farm. Every farm, and many town lots contain wood which needs cutting. Such fuel can be cut by the owner in his spare time, and often without any money outlay. For the city-dweller wood cutting would furnish much-needed exercise. Where the individual does not own his own woodland, public or even large private tracts should be opened under proper restrictions to persons wishing to cut their own wood. If properly done, the forests would be the better for it. This has been done already in many cases of unemployment relief,

especially in New England and in Pennsylvania. Expenditure of public funds for unemployment relief would have the greatest public advantage, if devoted to public works as well as to the benefit of the unemployed. In fuelwood cutting all interests are benefited; the public is benefited by the improvement to the forest (even in the case of private lands); the unemployed man is supplied with wood, and he has healthful outdoor work, far more desirable socially and psychologically than indoor or city employment. A further argument might be that money expended for fuel is kept at home and turned over in the immediate vicinity.

But what effect might the increased use of fuelwood have on the already harassed coal industry? Some adjustment is inevitable even with a decreasing use of wood. Governor Pinchot has suggested that there are too many miners, and some must seek other and more healthful vocations. He might well have suggested they work in the forest itself. The coal industry, then, is also suffering from over-production. But the really broad problem is the conservation of our resources. Coal is a non-renewable resource, and should be husbanded whenever possible. It has certain characteristics as a fuel which make it singularly valuable for specialized uses. It should be conserved for those uses. The same applies of course to oil.

Where wood can be substituted it should be used, since it is a renewable resource, growing continually. At present wood of fuelwood quality is growing so much faster than it is being used that it threatens to choke out better trees. This has been caused by extensive clear-cutting which has stimulated growth of inferior species at the expense of more valuable ones. Wood resources can be actually increased by using them judiciously; coal and minerals, once used become irrevocably depleted.

Wood also has certain desirable qualities as a fuel which recommend it. It is usually cleaner, can be used to produce more rapid heating, and its intangible attractions as an open fire fuel completely outweigh its somewhat lower fuel value weight for weight as

compared to coal. Who can tell what the inheritances of the blazing logs on the hearth have been to our national life? What great thoughts, resolves, poems even may have come from the flickering flames? Washington, Lincoln, Roosevelt, Whitman, a host of others, have sat by the fireside as children or peered into the campfire as young men. The coziness of a wood fire is everywhere recognized. Fireplaces are found invariably in the most costly homes, not alone for ventilation, but for the sentimental and, if you will, spiritual values.

Before wood can regain a prominent place as a fuel for homes and industries some important changes will have to be made in methods of cutting, hauling and marketing. Probably operations will always have to be localized and length of hauls restricted. Re-handling must be reduced to a minimum. At present direct motor truck haul from the stump to the consumer seems to work best. Power sawing and splitting, if done at all, should be carried out in the consumer's yard by portable sawing and splitting machines mounted on trucks. Custom sawing of this sort is already much in vogue in the Northeast. For the forest owner, sales on the stump are generally most satisfactory.

In conclusion the writer would like to raise the question whether a nation-wide campaign for greater use of wood fuel might not be opportune. The current activity for unemployment relief has been seized by advocates of forest planting, and proposals made for the use of unemployment funds for forestry. Surely no better forestry measures could be proposed than rational improvement cuttings, yielding fuel wood. State foresters, extension foresters, forest schools and others should make a concerted drive for greater use of wood for fuel as a forestry and conservation measure of the highest importance.

In the latter part of 1932, 1,200 acres (in a 10,000 acre tract) of Douglas-fir timberland in the Columbia National Forest, and 1,400 acres of spruce-hemlock in the Olympic National Forest, both in Washington, were set aside for educational and research purposes.

GIPSY MOTH IN PENNSYLVANIA

By J. N. Knull, Pennsylvania Forest Research Institute

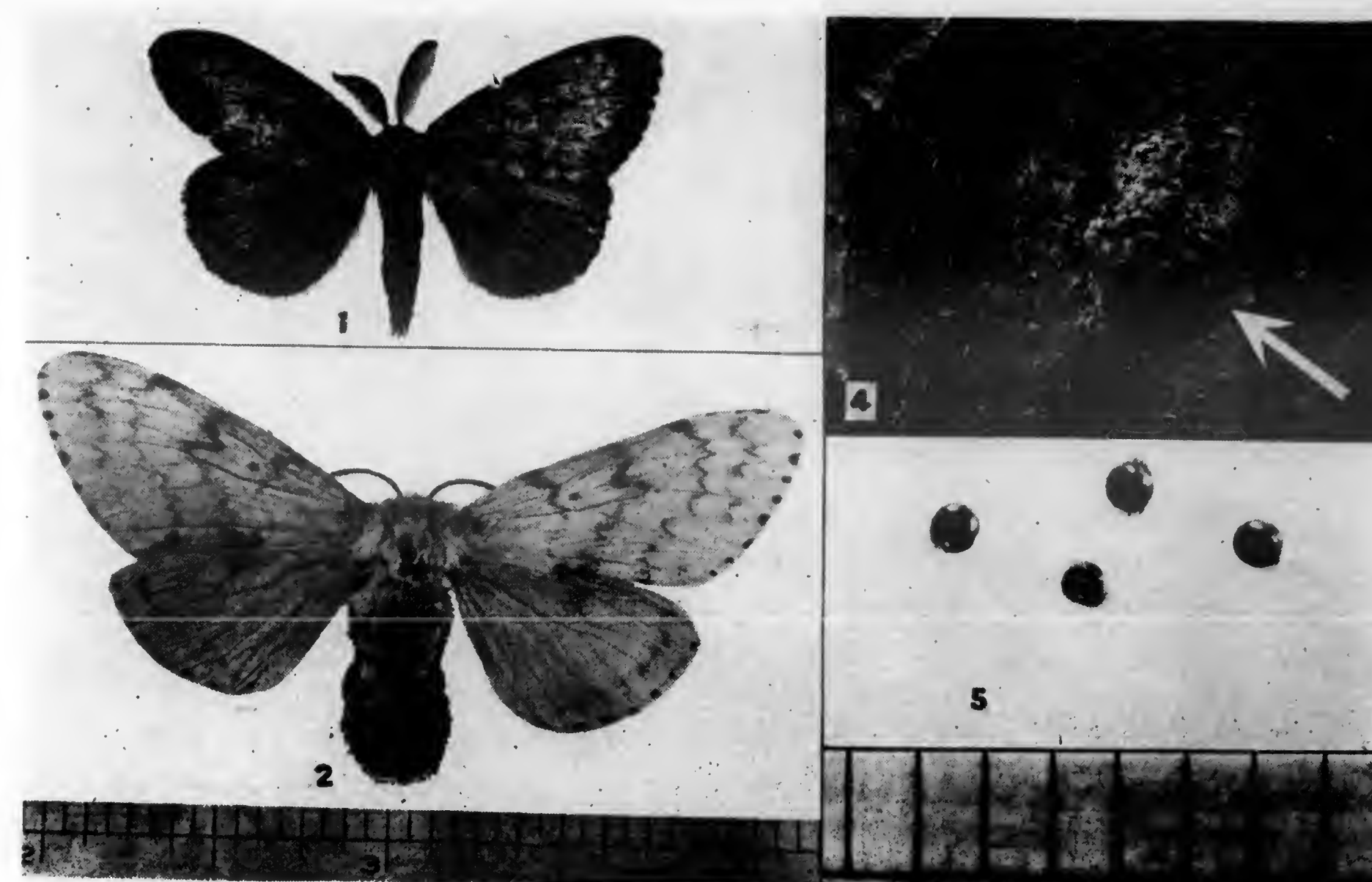
PROBABLY most persons have heard of the Gipsy Moth, a destructive forest insect pest, which has been present in New England since 1869. This infestation started from material which escaped from a French mathematician who had imported the insects from France for experimental purposes. It was his idea to cross the moth with the silkworm and thereby develop a hardy silk producing species. Evidently the pest escaped and it has done an immense amount of damage in New England since its introduction. It has been due to the constant efforts on the part of the state and federal entomologists that the insect has been kept within the quarantine area. From time to time small outlying colonies have been discovered in states adjacent to the quarantine area, but prompt action on the part of officials soon exterminated them. These isolated colonies included a small infestation at Loretto, Cambria County, Pennsylvania.

During the summer of 1932, a large infestation of this moth was discovered in the vicinity of Pittston, Luzerne County. From all appearances the insects have been unnoticed in that locality for a long time. Just how far the insect has been spread over Pennsylvania is a question which the future will answer.

INJURY

The injury is caused by the larvae which are ravenous foliage feeders. One hundred and fifty food plants have been recorded as furnishing food for them, including hardwoods, conifers, shrubs, and certain herbaceous plants. Oaks, aspen, gray birch, willow, alder, service berry, witchhazel and sumac are some of the favorite food plants of the larvae.

In New England thousands of trees have died due to repeated defoliation by the caterpillars. Trees not killed by defoliation are frequently so weakened by the loss of their foliage that they are attacked by secondary wood borers.



No. 1—MALE GIPSY MOTH.
No. 4—GIPSY MOTH EGG MASS ON OAK TRUNK.

Courtesy Department of Forests and Waters.
No. 2—FEMALE GIPSY MOTH.
No. 5—GIPSY MOTH EGGS TAKEN FROM MASS.

LIFE HISTORY

The gipsy moth lays its eggs in clusters of 400 to 1000 in number. These egg masses, which are deposited in the late summer in sheltered places on trees, buildings, stones, and similar locations, are covered with buff colored scales from the under sides of the bodies of the females. They might easily be mistaken for fungi since the eggs themselves are not visible through the thick coating of scales. The masses are oval in shape, 1/2-inch or more in diameter and quite conspicuous against a dark background during the winter. It is not unusual to find eggs deposited beside old egg masses and empty pupal skins, together making a conspicuous mass on trees.

The eggs start hatching in the spring about April or May. The hairy larvae which emerge from them spend some time on the masses before they start feeding on the leaves. In a heavily infested area it is not unusual to see trees totally stripped of their foliage by the end of June. The full grown larvae are from two to two and one-half inches in length. Each hairy caterpillar has two conspicuous rows of tubercles down its back. Those toward the head are blue, and those to the rear are red.

They are gregarious feeders and nocturnal in their habits. For this reason they frequently go unnoticed in localities where they are present. The full grown larvae usually crawl to some sheltered place similar to a depression in a tree or under a branch, where they spin loose webs for pupation.

The male pupae are considerably smaller than those which produce female moths. The pupae range in size from three-quarters to one and one-half inches in length.

The moths emerge in late summer and although the females do not fly, the males are strong fliers. The buff colored females are approximately two inches across their spread wings. The wings are ornamented with dark wavy markings. The males are considerably smaller in size, being about one and one-half inches across their wings. They are dark olive brown in color, ornamented with dark wavy markings. The antennae of the male moths are conspicuously feathery which is true of the males of many species of moths.

METHOD OF SPREAD

The natural spread of this moth in an isolated section might be slow owing to the fact

compared to coal. Who can tell what the inheritances of the blazing logs on the hearth have been to our national life? What great thoughts, resolves, poems even may have come from the flickering flames? Washington, Lincoln, Roosevelt, Whitman, a host of others, have sat by the fireside as children or peered into the campfire as young men. The coziness of a wood fire is everywhere recognized. Fireplaces are found invariably in the most costly homes, not alone for ventilation, but for the sentimental and, if you will, spiritual values.

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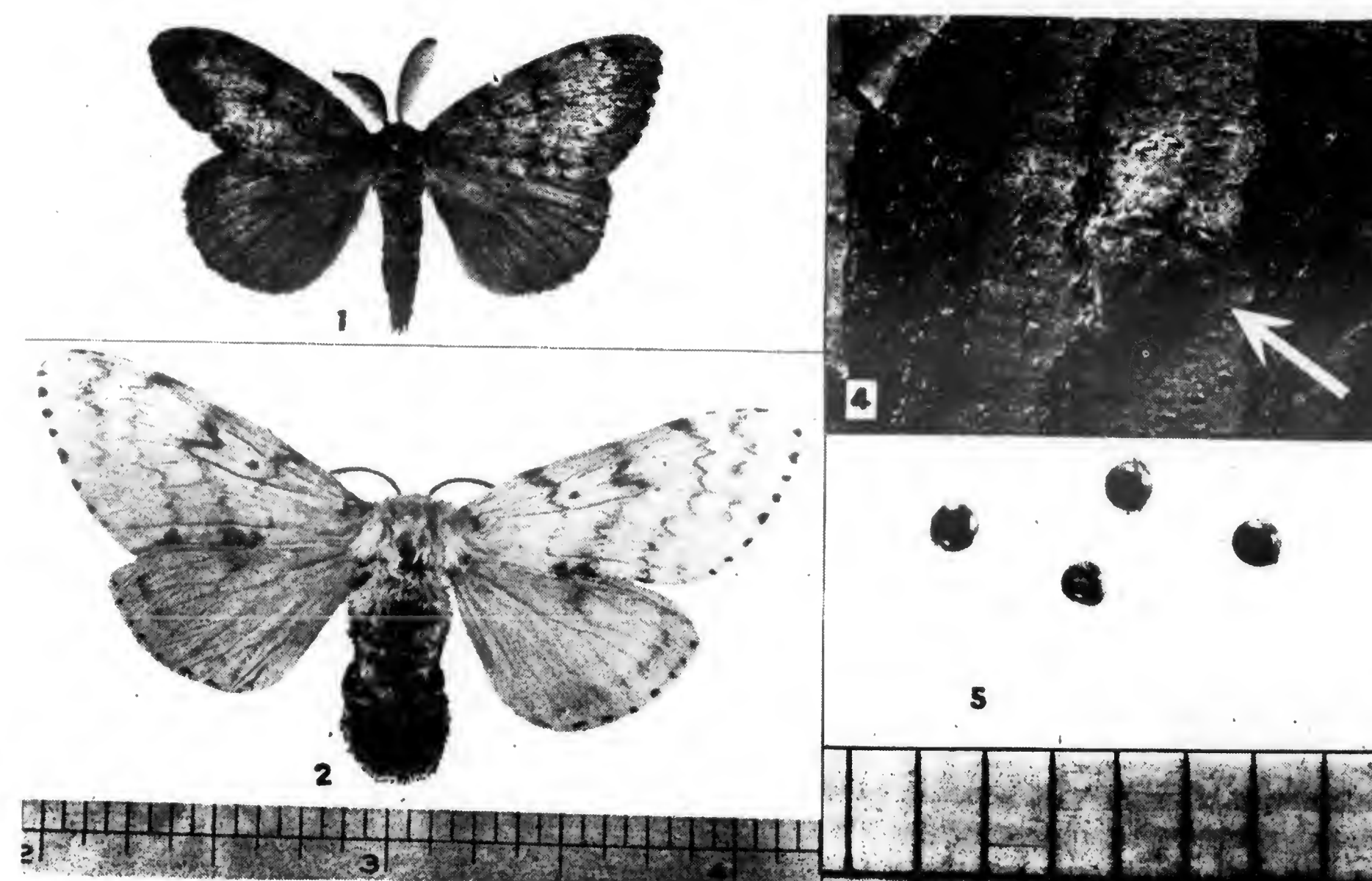
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METHOD OF SPREAD

The natural spread of this moth in an isolated section might be slow owing to the fact



No. 3—GIPSY MOTH EGG MASSES AND EMPTY PUPAL CASES, REDUCED.
No. 7—MALE GIPSY MOTH PUPA.

Courtesy Department of Forests and Waters.
No. 6—WILD BLACK CHERRY SHOWING EGG MASSES AND EMPTY PUPAL SKINS OF GIPSY MOTH.
No. 8—FEMALE GIPSY MOTH PUPA.

that the females do not fly. Normally the larvae would be responsible for extending an infested area. There have been recorded instances of the larvae being blown more than 20 miles by a strong wind. However, with our present day methods of transportation it is an easy matter to disseminate insects unintentionally. Eggs, caterpillars, or moths might be carried to far distant points by those not knowing their presence.

CONTROL MEASURES

Spraying. The foliage of trees can be protected against damage by the application of arsenical sprays. Any larvae feeding on the sprayed leaves are killed by the poison. By the addition of a sticker such as light pressed fish oil, the amount of the poison necessary for spraying can be reduced. A sticker prevents the poison from washing off the leaves and thereby makes it effective for a larger length of time.

Destroying Eggs. The egg masses can be destroyed by painting them with creosote mixed with lamp black. Eggs treated in this way will never hatch.

Banding. Various sticky banding materials have been developed for preventing the larvae from crawling to the crowns of trees. Since the larvae are nocturnal in their habits, loose burlap bands placed around the trees are ideal places for them to congregate in the daytime from which they can be collected and killed.

Silvicultural Methods. It is not practical to apply intensive control methods to large forest areas due to cost. Silvicultural management of stands of this type has to be resorted to. Since the gipsy moth shows a decided preference for certain species of trees, it is advisable to so manage heavily infested areas in such a way that these trees will be eliminated. The treatment will vary considerably with the forest type, site, soil, location, market, species, and numerous other factors.

FOREST FIRES IN THE POCONOS

By Ralph C. Hawley, Professor of Forestry,
Yale University

Natural Control. When destructive insects such as the gipsy moth are introduced into another country, nature's balance is upset. The controlling factors in their native lands are absent and they are at liberty to increase in great numbers. The U. S. Bureau of Entomology has introduced exotic parasites and predators to control this pest and many of them show great promise. These introduced forms, together with our native parasites and predators, undoubtedly will aid greatly in reducing the infestation. There is also a bacterial "wilt" disease which attacks and kills the caterpillars and pupae.

QUARANTINE

Quarantine of the infested area and the inspection of out-going material has aided greatly in keeping the insect within definite limits in New England.

HOW TO TELL AN INFECTION

Undoubtedly many of our native insects might be mistaken for gipsy moths by those not familiar with entomology. The buff colored egg masses attached to dark trunks of trees are very conspicuous during the winter. However they might easily be mistaken for fungi by those not familiar with insect life. The empty pupal cases in masses of webs in sheltered places are also characteristic of the insect.

In the season when the foliage is on the trees, a heavy infestation can be told by the injury to the leaves. We have native insects which frequently cause defoliation and in fact have killed large areas of our forests in the past.

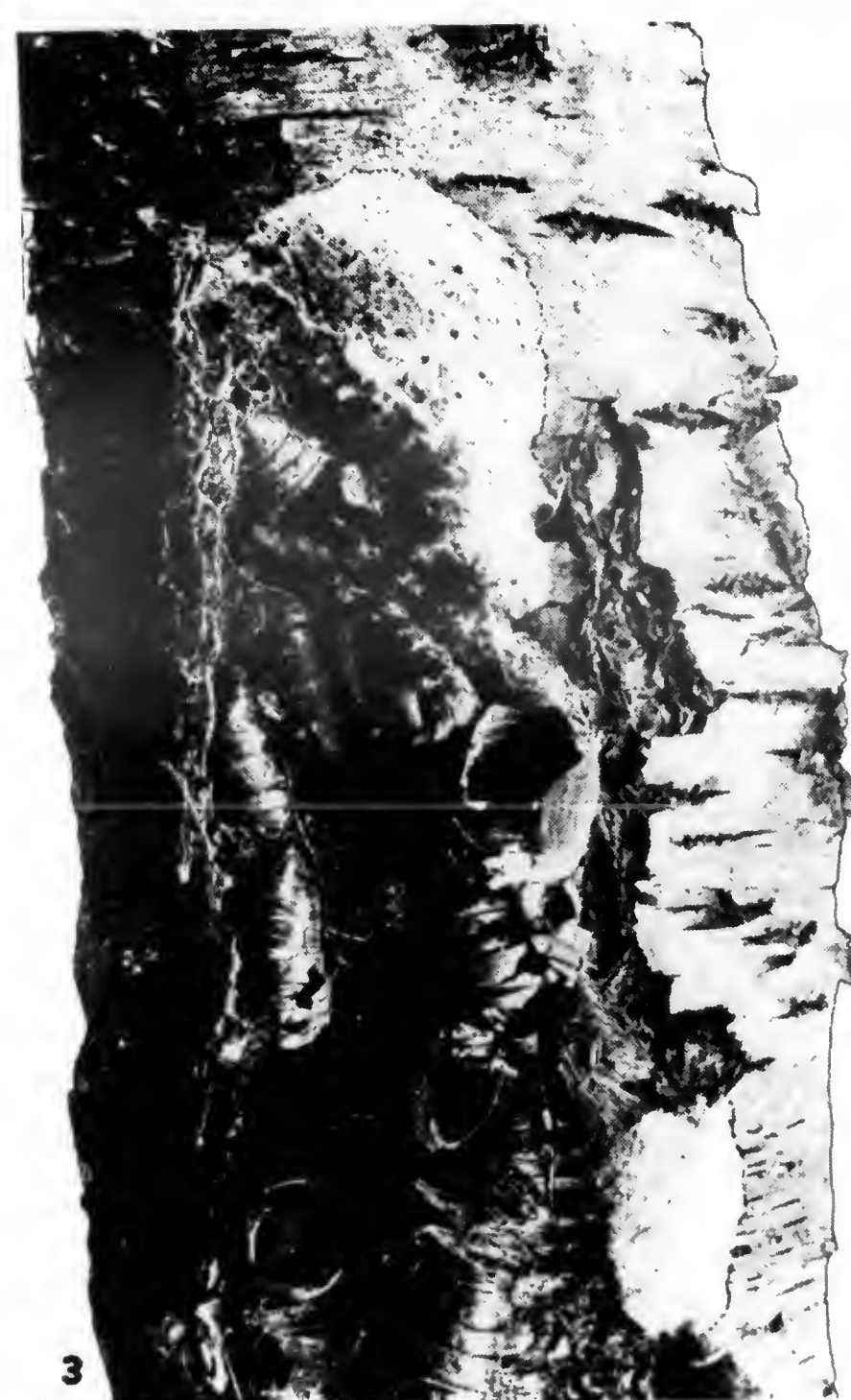
Any person suspecting the presence of gipsy moth should submit specimens to reliable authorities for identification. The Forest Research Institute, Mont Alto, Pa., will be glad to receive material of this kind.

Begin now to find and remove egg masses of the Tent Caterpillar. Later the tents will appear. These can be destroyed by burning, or if this would harm a choice tree, a sop of kerosene on the nest will work through and destroy the insects. Especially watch cherry and apple trees.

DURING the last thirty years I have passed nine summers in Pike and Monroe Counties, Pennsylvania. While most of the time was spent in the summer camp of the Yale School of Forestry near Milford, Pa., I became familiar with the forested sections of these counties as far south as the Lake Pocono Preserve. Within late years I have not had occasion to revisit the Poconos until an opportunity for a trip presented itself this fall. On traveling through the mountains I was much surprised to find that the forest fire menace still appeared to be exceedingly acute. Fires of incendiary origin intentionally set for the definite purpose of burning over forest tracts apparently are still of too common occurrence.

Thirty years ago the region showed evidence of frequent and serious fires. Progress in reducing the number and severity of the fires has evidently been slow. In many sections of the country there has come a realization as to the destructive influence of fires and a decided change in the attitude of the people regarding them. This in turn has been reflected in improved fire control. The Pocono region apparently is one of the sections of the country where the people are not yet fully awakened to the damage done directly to their property or indirectly to them in other ways by forest fires.

It seems incredible that communities of intelligent people should be so indifferent to the periodic burning over of large areas of their forests. This is particularly to be wondered at in a region like the Poconos whose future is closely linked up with the recreational development of the area and where the forest is the chief natural resource. The Poconos can scarcely be considered an agricultural section. They have a high percentage of the area wooded which should eventually be covered with high forest rather than young sprouts. These future forests, the clear flowing streams, the broken topography with many interesting ravines all join to make the region one with an exceedingly attractive future for recreational



No. 3—GIPSY MOTH EGG MASSES AND EMPTY PUPAL CASES, REDUCED.

No. 7—MALE GIPSY MOTH PUPA.

that the females do not fly. Normally the larvae would be responsible for extending an infested area. There have been recorded instances of the larvae being blown more than 20 miles by a strong wind. However, with our present day methods of transportation it is an easy matter to disseminate insects unintentionally. Eggs, caterpillars, or moths might be carried to far distant points by those not knowing their presence.

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No. 6—WILD BLACK CHERRY SHOWING EGG MASSES AND EMPTY PUPAL SKINS OF GIPSY MOTH.

No. 8—FEMALE GIPSY MOTH PUPA.

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purposes. Its highest usefulness for such purposes cannot be attained until the fire menace is controlled.

Among the people in the Poconos there seems to be prevalent the idea that good forests cannot grow on the Pocono Plateau. They refer to the present forests as "scrub oak," and think of it as a worthless low shrubby growth with no future possibility either for the production of timber or for development into attractive scenic forests. Along with this idea goes the thought that since the growth is of this character, burning it over every few years cannot cause any serious injury because the scrub oak sends forth sprouts and soon attains its former height. Such ideas are misleading.

Should these people make a careful study of the so-called "scrub oak" areas on the Poconos they would learn that there are several varieties of oak on the burned-over areas. One of them is indeed correctly termed "scrub oak." It is a distinct species which never attains a size more than that of a woody shrub, perhaps 15 feet in height, and is entirely worthless for wood or timber and has practically no scenic value. But along with the worthless scrub oak there are mixed in several valuable timber trees; two of the most abundant being the red oak and the white oak. These important timber species both north, south, east and west of the Pocono Plateau attain sizes of over 2 feet in diameter and 100 feet in height and furnish some of our most valuable hardwood timber. What is the reason that they do not form forests of commercial size and aesthetic beauty throughout the Poconos? The answer is that there is no reason, except that the people of the Poconos insist on burning over the forest areas, killing the red and white oak trees before they are able to attain timber size.

Let us see what happens when a young forest of mixed oak, say 20 years of age is burned over. If we inspect this forest before the fire, we would usually find that the red and white oak trees, together with a number of other species, are covering the area with their crowns and forming practically a complete canopy over the soil. Under the cover of these better hard-

woods there are likely to be scattered individuals of the genuine scrub oak, existing there as an under-story. The fire sweeps through this stand killing all portions of the trees and shrubs which are above ground. The roots remain intact. The stored-up food supplies in the roots enable the trees and shrubs to send forth vigorous sprouts after the fire and to reclothe the area with vegetation.

Now the genuine scrub oak is particularly vigorous in its sprouting habit and after the fire has a chance, which it would not have had under the shade of the hardwood stand, to develop vigorously and to gain somewhat more room than it had before. Sprouts from the red oak and white oak stumps start also, and after the first year or two grow faster in height than the scrub oak. Within a 10-year period they are considerably taller than the scrub oak and are spreading out sideways and commencing to overtop the scrub oak. Left unburned they will ultimately reduce the scrub oak to the position of a weakly growing shrub under a high cover of good hardwood. Indeed, if fires are kept out long enough the scrub oak may eventually be exterminated.

But if another fire is run through the stand, particularly if it comes within 10 years after the first fire, the growth is completely killed back to the ground again and the scrub oak has another chance to dominate the stand for a few years. Repeated fires at short intervals favor the increase of the scrub oak as contrasted to the good species such as red and white oak. Where fires occur at short intervals seed production by red and white oaks is prevented, since these species must attain considerable age before they can produce seed. The scrub oak, however, is an early seeder, producing acorns before the tenth year of its life and is able, even when fires recur frequently, to start new plants on the area and hence become more abundant than the red and white oaks. Repeated fires tend to drive out the good species and eventually may leave nothing but the genuine scrub oak in possession of the land.

The soils of the Poconos are sufficiently fertile, of adequate depth and of heavy enough texture to support good forest growth. Eventually the Pocono Plateau should be the seat of

a thriving lumber industry as well as maintaining its present position as a choice resort section. In fact, its attractiveness as a resort section will be increased many fold when a forest cover replaces the young sprout growth now occupying too much of the area.

Before a satisfactory forest cover can be established in the Poconos the sentiment among the people living within the region must be changed. They must realize that when they burn forest areas at short intervals they are injuring themselves and their communities through decreasing the possible revenue which may be obtained directly and indirectly from the growth of timber.

If the people who are setting fires are outsiders rather than natives of the region their depredations can be satisfactorily controlled just as soon and only as soon as sentiment within the region develops to the point where the people of the Poconos and adjoining communities desire to conserve rather than to destroy their most important natural resource.

MOUNTAIN RESORT APPRECIATES FORESTRY

PERTINENT to Prof. Hawley's article above, is the following information regarding action of the Buck Hill Falls Company. The manager, Mr. Charles N. Thompson, a member of this Association, has been for many years president of the active Pocono Forestry Association. This was active in having C. R. Bensinger, Esq., appointed a Special Deputy District Attorney by Monroe County Courts, which resulted in extensive investigations of the causes of several severe fires in Barrett township, and of the alleged violation of hunting laws in shooting deer at night. The inquiry resulted in complete vindication of fire fighting methods employed in fighting the conflagrations last Fall.

Not only does this company protect forests, it also plants. Young trees have been set out where the trees on the 4,000 acre estate were inferior, the total for the past two years amounting to 78,000 of Red Pine, Scotch Pine, White Pine and Norway Spruce. Included in the area is a large stand of virgin forest, which

contributed several Hemlocks to Dr. Wildman's list of Penn Trees, the largest being 10½ feet in circumference at breast height.

NEW ORGANIZATION TO EXPLORE FOREST WILDERNESS

THAT the remnants of the great American Wilderness might be enjoyed by outdoor loving people, the American Forestry Association has announced the organization of the "Trail Riders of the National Forests," to be a national and, it is hoped, a permanent project. The purpose is to give opportunity for exploration, under organized leadership, of untamed country—primitive areas, unchanged.

In cooperation with the United States Forest Service and with experienced guides and forest rangers accompanying, two trips will be made this summer. Provision is made for both men and women. The first, early in July, will explore the South Fork Wilderness of the Flathead National Forest in Montana. This will be through one of the most rugged and wild areas remaining in the country, and has been established as a permanent Wilderness Area by the Federal Government.

The second ride, in August, will be into the Sun River Wilderness of the Lewis and Clark National Forest, also in Montana, another untamed area of natural beauty.

In commenting on this project, Mr. Ovid Butler says: "These unspoiled regions are primitive nature's greatest temples, saved for the use and enjoyment of all the people. Here man may satisfy his inherent longing for adventure and for physical exploration. . . . But the wilderness trails are not so easily found or so easily followed. The public for which they have been preserved have had no opportunity for organized exploration or for their enjoyment. This service the 'Trail Riders of the National Forest' performs."

To add a pound to its body weight a birch or basswood tree must give off 700 to 800 pounds of water, while pines would transpire only between 40 and 70 pounds to make the same growth.

TAX DELINQUENT LANDS

IN another article in this issue there is described a bill, now before the General Assembly, to relieve the growing burden of tax delinquent lands.

A recent letter from the Secretary of Agriculture, pursuant to Senate Resolution 175 says: "The State problem includes the forested portion of Federal grants which have never been given a legal status as State forests and placed under management, and the much larger area in various stages of reversion to public ownership because of tax delinquency. Tax delinquency is creating a new public domain not of forested land but largely instead, of devastated forest land, and of such size that it promises to be a heavy burden. Few States have legislation that provides for a solution, and still fewer take advantage of the legislation they have."

In a statement accompany two proposals looking to application of sound forest policies, the Committee on Natural Resources of the Chamber of Commerce of the United States, says, in part: "Extensive areas (of forest lands) are today tax delinquent and are increasing at a rapid rate. This threatened loss of taxable property is alarming communities whose prosperity depends upon the maintenance of forest resources. Prompt remedial measures should be applied if these processes of devaluation of forest lands are to be stopped short of reaching a condition comparable to that in some branches of agriculture."

A study by E. A. Ziegler, Director of the Forest Research Institute of the Department of Forests and Waters, discusses a forest tax study in seven Pennsylvania counties—Center, Clinton, Sullivan, Elk, Potter, Crawford and Franklin. This reveals that prior to 1930 unredeemed tax sales of unseated (forest) land privately owned averaged 4.7 per cent. of these lands at each biennial sale. In 1930, the advertised tax sales (still subject to redemption for two years) averaged 16.5 per cent. of these lands.

Deducting farm woodlands and government forest lands, and allowing for the fact that the first five of these counties probably mark the

extreme cases, there appears to be about one million acres of forest land in the State either already in the hands of the counties by tax title, or advertised for tax sale in 1932. Taxes delinquent to 1930-1931 and 1932 taxes unpaid will raise these figures. Probably half of this, or 500,000 acres will fail to be redeemed or find private buyers.

Already in one county tax title has run beyond the redemption period for a total of 28,469 acres.

He concludes with the statement: "There is a real problem here that the Commonwealth cannot ignore."

Since 1910 the Borough of Chambersburg has been procuring water from the Michaux State Forest, and pays to the Commonwealth half of one per cent. of the gross receipts from the sale of water.

PENN'S WOODS—1682-1932

By Edward E. Wildman. 192 Pages, with 70 Illustrations. Christopher Sower Company, 124 N. 18th Street, Philadelphia, Pa. \$1.50.

LOVERS of trees, those interested in natural history, and all who relish excerpts of the early history of Pennsylvania, will find pleasurable reading in this little booklet. While the result of a conception to seek and record trees which had been growing in the Lower Delaware Valley since William Penn first landed, the book is by no means a mere tabulation of these venerable living links with the origin of our Commonwealth. Interest and readability are maintained throughout.

Worthy additions to the main theme, are Mr. Charles F. Jenkins' introduction, the excerpts from Penn's report to The Free Society of Traders, Mrs. Lynwood R. Holmes' chapter on Historical Trees of Pennsylvania and that on Remnants of Primeval Forest in Pennsylvania by Mr. Francis R. Cope, Jr. Its perusal leaves one informed on many things and in a pleasant way. As Mr. Smedley has said, "We commend this little book to all our members and their friends."

DEPARTMENT OF FORESTRY
STATE COLLEGE

FOREST LEAVES

JULY, 1933

IN MEMORY OF
SIMON B. ELLIOTT
1830-1917
A PIONEER OF FOREST CONSERVATION
ADVOCATE OF FOREST TREE PLANTING
OF THE PENNSYLVANIA STATE FOREST REVENUE
COMMISSION FROM 1884 UNTIL HIS DEATH
HIS NOBLE LIFE AND SERVICE
AN INSPIRATION TO ALL INTERESTED IN THE
CONSERVATION OF FORESTS.
ERECTED IN THE FOREST REVENUE BUILDING
WITH THE PENNSYLVANIA FOREST REVENUE
FORESTS AND WATERS

PUBLISHED BY THE
PENNSYLVANIA FORESTRY ASSOCIATION
PHILADELPHIA, PA.

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THE PENNSYLVANIA FORESTRY ASSOCIATION

FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 306 Commercial Trust Building, Philadelphia.

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Francis R. Cope, Jr., Edward Woolman

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EDITORIAL

OUR members will regret to learn of the decease of Mrs. Samuel L. Smedley. Although in failing health for some time she had, until lately, been an interested attendant at our Annual and Summer meetings. The simple service of the Friends held at her home, among the hills of Delaware County, accompanied by the sounds of winds in the trees and the calls of birds, was in keeping with her life and her interests.

The recent Summer Meeting has emphasized two features of our forests which had previously not been fully recognized by many of our members and by others resident in the Commonwealth. One is the large number of opportunities for pleasure and recreation offered by the State Forests and Forest Parks. More than 80 copies of the Recreational Map, published by the Department of Forests and Waters, were distributed to interested individuals, although we were in a region where the residents make many visits into the wooded areas.

The other was the visible demonstration of the damage to forests when deer become too numerous. One of our illustrations demonstrates what some of us saw, evergreens held to stunted growth because the deer kept the new shoots nibbled off. Other views were had of forested areas in which all green growth up to five feet above the ground had been destroyed. Practically everyone desires that there be deer in the forests—to which we entirely agree. But when the deer have become too numerous in certain regions, so that insufficient food leads to stunted fawns, inroads of disease and, as has been known, deaths by starvation, a situation inimical both to our wild life and our forests results. Frank recognition of these facts justifies reduction of

herds, even when this requires the slaughter of does. If the Game Commission again finds it essential to permit killing does in certain areas, the public should recognize that such action has been taken because of necessity and for no other reason.

Readers in the infested region will receive this issue when the Japanese beetles are at a maximum. In many areas there has been previous poisoning of the grubs in the ground and the protection of leafage by sprays, but it is obviously impossible that such methods can be applied to all the area involved. Hence it is now beetle-trap time, which also means that the traps must be kept supplied with bait that is strongly odorous. Occasionally we meet the idea that traps attract more beetles than they catch. Perhaps the odor of the bait does bring some from a neighboring tract before a shifting wind would carry them. But the fact is that relief can only be obtained by all possible means of destruction. The Federal Government imports and releases natural parasites, and the birds do excellent work. Adding the combined efforts of many individuals will materially reduce beetle damage. As Calvin Coolidge has said: "Cooperation is not a virtue—it is a public necessity."

The work goes on. Our officers and some of our members are devoting time at this season to meetings with County Commissioners regarding the recent legislation permitting counties to acquire unseated tax-delinquent lands for forests. The committee on preservation of virgin forest areas is continuing its activities. Reference is made elsewhere to the work done to preserve the ancient oak at King of Prussia. Also the membership committee has been active, and bespeaks your cooperation.

HISTORIC TREE TO BE DEDICATED TO DR. DRINKER

ON August 19, 1933 at 4 P.M. exercises will be held at the old white oak at King of Prussia, when this tree, which long preceded William Penn's birth, will be dedicated to our former President, Dr. Henry Sturgis Drinker, as a tribute to his long and worthy activities in forestry and conservation.

This tree, which stands by Route 23, near its junction with U. S. Route 122, is on the property of Mr. Alexander H. Crockett, who has offered to donate the tree and land around it, so that it may be preserved. Mr. Crockett, our member Mr. Henry R. Frorer and others interested in preserving historical features, have had the tree cleaned and protected, so that it may be preserved. This Association having been invited to cooperate to dedicate and mark the tree, some of the members have arranged for the installation of a bronze tablet, and have planned brief dedicatory exercises. Mr. Crockett has offered the use of adjoining land which abuts on a private lane leading from the road and which will accommodate a large number of cars.

An interesting description of this tree is given on page 71 of "Penn's Woods, 1682-1932."

We are grateful to Mr. Crockett for his generosity and public spirit, and welcome the opportunity offered to signify our gratitude to Dr. Drinker for his unselfish labors.

We invite our members, the friends of Dr. Drinker, all interested in historical landmarks and forestry, and Boy and Girl Scouts to attend. Exercises will be held at 4 P.M. Daylight Time on Saturday, August 19th, or in the event of rain, at the same hour on the next clear Saturday.

1933 SUMMER MEETING

IT has become habitual with this Association that at our Summer Meeting we always meet pleasant people, view regions of interest and natural charm, and learn many interesting things about forestry. The recent meeting at Clearfield ran true to form, and we recall with a real pleasure interesting sessions,

instructive tours and discussions and sights of the new Penn's Woods. For these we are especially indebted to our fellow members, Mr. George H. Wirt, Mr. William F. Dague, and their associates. In fact the full and willing assistance of the Department of Forests and Waters contributed greatly to the success of the meeting, while, the Hotel Dimeling and the people of Clearfield aided by the interest and cooperation evidenced.

Members and their friends met at the Dimeling where the first evening session was held on the evening of June 22nd, our attendance being enlarged by a number of the citizens of Clearfield. As President Smedley was compelled to forego attendance because of Mrs. Smedley's serious illness, Vice-President McCaleb acted as Chairman, and asked the Secretary to read the Presidential address, which we print separately. Mr. McCaleb confirmed the effect of the work and publicity given forestry by the Civilian Conservation Corps, and stated that he looked for practical results from this.

Hon. Lewis E. Staley, Secretary of the Department of Forests and Waters, had planned to be with us, but his additional duties as chairman of a newly appointed committee on work for the Commonwealth had required his absence from the State. His regrets were conveyed by Mr. Wirt, who, at the request of the Chair, presented Mr. Staley's address on "Bringing Back Penn's Woods." This is also given elsewhere in this issue.

At the request of the Chair Mr. Wirt then spoke on the forest fire situation this spring. The spring of 1933, he said, was unusually favorable to the forests—but between showers there were some fires, and he emphasized that forest fires will burn even during a rain. The total number of fires this spring was about 1,000. Since records were started in 1915 there were only two other spring seasons when the number of fires was less than 1,000, and the 1933 season was below the average for the past decade. The acreage burned was the least on record, and will total about twenty-three or twenty-four thousand acres. The organization seeks for low acreage damaged per fire.

The largest fire up to May 31st was less



Too Many Deer—Damage to Young Evergreens.
Courtesy Department of Forests and Waters.

than 500 acres, but on that day, in the Pocono region, some one set 22 fires along the road, and in less than a half hour after the warden saw smoke there was a line of fire 4,500 feet long. After 6 hours work the fire was extinguished, but 2,500 acres had been burned.

The Chair thanked Mr. Wirt for his talk, and expressed regret that the recent Legislature had appropriated no money for more forest land purchases.

On behalf of the Association the Secretary, presented to Mr. Blake T. Owens, an active Scoutmaster, a copy of "Penn's Woods, 1682-1932", as our gift to the Boy Scouts of Clearfield. Having subsequently learned of the activities of the Clearfield Scouts and of their and Mr. Owens' interest and activities in forestry, we know that the gift was particularly appropriate.

Mr. Dague, District Forester, then outlined the general plan for the next day's excursions.

Prof. George S. Perry of Mont Alto spoke on "Interesting Forest Facts", and his remarks well fulfilled the title. This paper will be published in our next issue.

At the suggestion of Mr. Richards a motion

was passed that the Secretary send a letter of regret to Mr. and Mrs. Smedley.

The meeting closed with a hearty appreciation by Hon. Dan Leffler, the Burgess of Clearfield, who expressed his pleasure at being present. He referred to his real interest in the papers he had heard that evening and the very interesting information they contained. The people of Clearfield, he said, welcomed us, not only as guests, but because of what we had done, for they know and appreciate the forests about them. They also appreciate the great amount of good work which Mr. Dague has done.

The new motion picture of the Department, "Forests and Recreation" was an excellent demonstration of what the State Forests can mean to the citizens. Credit is due Mr. R. Lynn Emerick, Chief of the Bureau of Information, who not only directed the taking of this film, but who came in person to Clearfield with it, and our Association is grateful to him and Mr. Russell M. Ziegler, Exhibitor, for its presentation. Some pictures of recent relief work in the State Forests brought the session to an end.

The following morning the party toured to the Old Town Fire Tower, from which a view could be had over the surrounding country. The views of habitations, farms, fields, and woods and, back of all, the mountains, justified the climb up the tower. From there we rode through the woods, all a glory of laurel, past one of the forest game refuges, by previous plantations made by the State, terminating at the Clearfield Nursery. This is the largest of the State nurseries, and ships about 8,000,000 trees yearly. Our host and guide, District Forester Dague, showed and explained the different seedling beds, told why and for what purpose certain trees were grown, related the methods of planting, growing, digging and shipping trees, and gave a realistic picture of what a large and effective work is done at this nursery.

Immediately adjoining was the S. B. Elliott Memorial Forest Park, next to the nursery which was established at his suggestion. Here we lunched and idled among the trees until the memorial exercises at the unveiling of the tablet in honor of Mr. Elliott, which was attended by more than 400 foresters, wardens, friends of forestry, and their families. Mr. Elliott had contributed so helpfully and so long to forestry, both National and State, and had been such a valuable member of this Association, that we were particularly glad to unite in the simple services of affection and tribute. All spoke briefly and showed appreciation of the man and his services.

After an invocation by Rev. Adolph Kamirath, the tablet was unveiled by Mr. Elliott's daughter, Mrs. F. M. Brown of Reynoldsville. Charles M. Elliott, Esq. of Wellsboro, made the dedicatory address in which he referred to the foresight and clear thinking of Mr. Elliott. Our members, Hon. J. Linn Harris, formerly a member of the State Forest Commission, and Mr. E. W. Hess, also touched on Mr. Elliott's love of nature, his love of his fellow man and the nobility of his character, wherein he rejoiced in his labors for the common good. In conclusion Mr. McCaleb referred to the fact that the hemlock, planted by this Association at its Summer Meeting, was on this occasion properly dedicated to and planted as a memorial to Mr. Elliott.

On behalf of the local service clubs the Boy Scouts of Clearfield placed a laurel wreath on the boulder.

Subsequent to the exercises a visit was made to Camp S-116 (the Clearfield Nursery Camp) of the Civilian Conservation Corps. Under Mr. Dague's guidance we traversed a section of highway under construction by this unit, and the slow and rough passage over the heavy stone base of hand-broken stone demonstrated that these workers had been applying muscle. At the camp we were cordially greeted by Capt. Dooley and his assistants, Lt. Williams and Lt. Ball. A cleared camp area and a large pile of cord wood were further evidences of work done in the two weeks since the unit had arrived. The work for that day had ended, but a number of bronzed and healthy looking young men were digging out stiff clay to build a swimming pool. A walk around the camp and chats with the officers and men gave us an interesting insight into the camp, its personnel and the work it was doing.

That evening another session was held at the Dimeling with an increased attendance, including a number of Boy Scouts. Vice-President McCaleb's opening address on The National Forest Situation, with the resulting discussion, is printed elsewhere. Mr. A. L. Hough, Asst. Silviculturist of the Allegheny Forest Experiment Station, U. S. Forest Service, then spoke on Natural Forest Enemies. We are gratified that Mr. Hough has agreed to compile his remarks into an article for a later issue of *Forest Leaves*, for it contained much good "meat."

The Chair, having noted Mr. George A. Stewart, of Clearfield, a member of the Game Commission, asked him for some remarks. Mr. Stewart stated frankly that the people of the region were deeply indebted to the Pennsylvania Forestry Association, for they had seen what were barren wastes turned into growing forests and recreation centers. This, he said, was due to the foresight and energy of members of the Association. He said "We bow to you, as our peers, for men of courage and foresight have wrought this beneficial change. Now we can see the goal toward which you aimed. Often I wondered who it was that always got behind and pushed every

movement to aid the forestry situation, and now I know it was the Pennsylvania Forestry Association. I thank this Association for the good work you have done."

A letter was read, from Senator Harry B. Scott of Philipsburg, regretting his inability to attend the meeting, which said: "I can appreciate the importance of your Association because of what it can do and has done in the interest of reforestation and the assistance rendered to the Forestry Department. You can be assured I am in thorough sympathy with the fine work you are doing."

Mr. W. Gard Conklin, Chief Bureau of Game Refuges, presented a paper on Game Management in the Forest, which will be given in the next issue of *Forest Leaves*.

Our member, Mr. E. W. Hess of Clearfield, told that last autumn 3,000 pounds of deer meat from the adjoining forest lands had been contributed to the local Welfare. Further, that in the Spring of 1932, 200 men had applied through the Welfare to plant trees under Mr. Dague's direction. A total of 175,000 trees from the Clearfield Nursery had been thus planted, and at the end of the first year 95 per cent were growing.

Mr. Russell M. Ziegler then showed the new motion picture "The Red Enemy", followed by others of the Civilian Conservation Corps camps in the forests, which closed the session, and terminated the 1933 Summer Meeting, except for such visits to forest areas as were made the next day by returning members.

For the success of the meeting we are indebted to the excellent work of interested members and to the Hotel Dimeling and the Department of Forests and Waters. The Association expresses appreciation and thanks, and looks forward to another good meeting next summer.

Applications for trees for reforestation this Spring have been received from companies, institutions, political sub-divisions and individuals in the county and in the State. A total of 6,000,000 trees were shipped to fill the 1,600 orders. Nearly 2,000,000 of these trees were planted in 8 counties.

PRESIDENTIAL ADDRESS AT 1933 SUMMER MEETING

MEMBERS of the Pennsylvania Forestry Association are gathering at Clearfield for their annual Summer Meeting with feelings of deep gratitude and interest. We are asked to join with the Department of Forests and Waters in an act to perpetuate the memory of Simon B. Elliott, one who was an outstanding pioneer in the movement for reforestation in our State; one who became a forester by conviction. This was brought about by his first serving and participating in the unguided destruction of our original stand of timber.

From this experience he became one of the first to join in the organization of The Pennsylvania Forestry Association, and was an active member during the balance of his life.

So we are most happy to participate in the exercises pertaining to the formal setting aside of this forest area, and the proper marking of it, to the memory of a man who was so active in the cause in which we are all so vitally interested.

There is a certain appropriateness in selecting the year 1933 as a suitable time for this dedication, as it is the year when the greatest step toward reforestation has taken place in this country.

The President has called from various walks of life two hundred and fifty thousand young men to enter into forestry service. Young men with all the energy of youth, yet by reason of economic conditions in our country, have had very little opportunity or outlook looking toward self support. These young men are being placed in our National and State forests, amid surroundings and conditions never dreamed of by many of them. They are being fed, cared for and given a reasonable compensation.

It is but natural to suppose that many of these young men will receive a new vision of life, a vision that carries with it the appeal of the great out-doors, and an endless field of study. Again, these two hundred and fifty thousand young men have personal contacts with a million others who are going to learn

about their activities and the joy that comes from living so near to nature.

I can readily see how 1933 is going to mark a new era in the forestry activities of our country; a time when forestry is going to become a far greater factor in our economic and social conditions than ever before.

Our Association has ever been on the alert to foster and assist in any movement pertaining to the advancement of forestry in our State.

This new condition is coming as a challenge to everyone of our members to be on the alert, that we may keep the lead in this great onrush this army of young men are going to bring about.

Our Association, during the past year, has actively co-operated with the Department of Forests and Waters in their efforts to procure legislation that would broaden the powers and scope of work, with very gratifying results. A very unsatisfactory condition has existed as to the disposal of tax-delinquent lands in the hands of County Commissioners. A bill was prepared by a committee of our Association, in co-operation with the Department of Forests and Waters, giving the County Commissioners the right to reforest such lands, or to turn them over to the State for that purpose. There are now over one million acres of such lands in Pennsylvania, which prior to the passage of this bill the County Commissioners could not dispose of.

This bill was passed by both Houses of the Legislature and later signed by the Governor, and is now a most valuable addition to the laws under which our Department of Forests and Waters is operating. As one of the legislators said: "This is constructive conservation legislation, and we need it."

Much attention has been and is being given toward acquiring lands for forestry purposes, also for technical study, and we hope ere another year we can report some valuable acquisitions on these lines. It is most important that our Association continue to function to its fullest capacity, and additional members will prove a great assistance.

SAMUEL L. SMEDLEY.

BRINGING BACK PENN'S WOODS*

By Lewis E. Staley, Secretary Department of Forests and Waters

NATURE made Pennsylvania a great State endowed with a storehouse of seemingly inexhaustible resources. There is no phase of Pennsylvania's progress that is more interesting than that relating to her great forest resources.

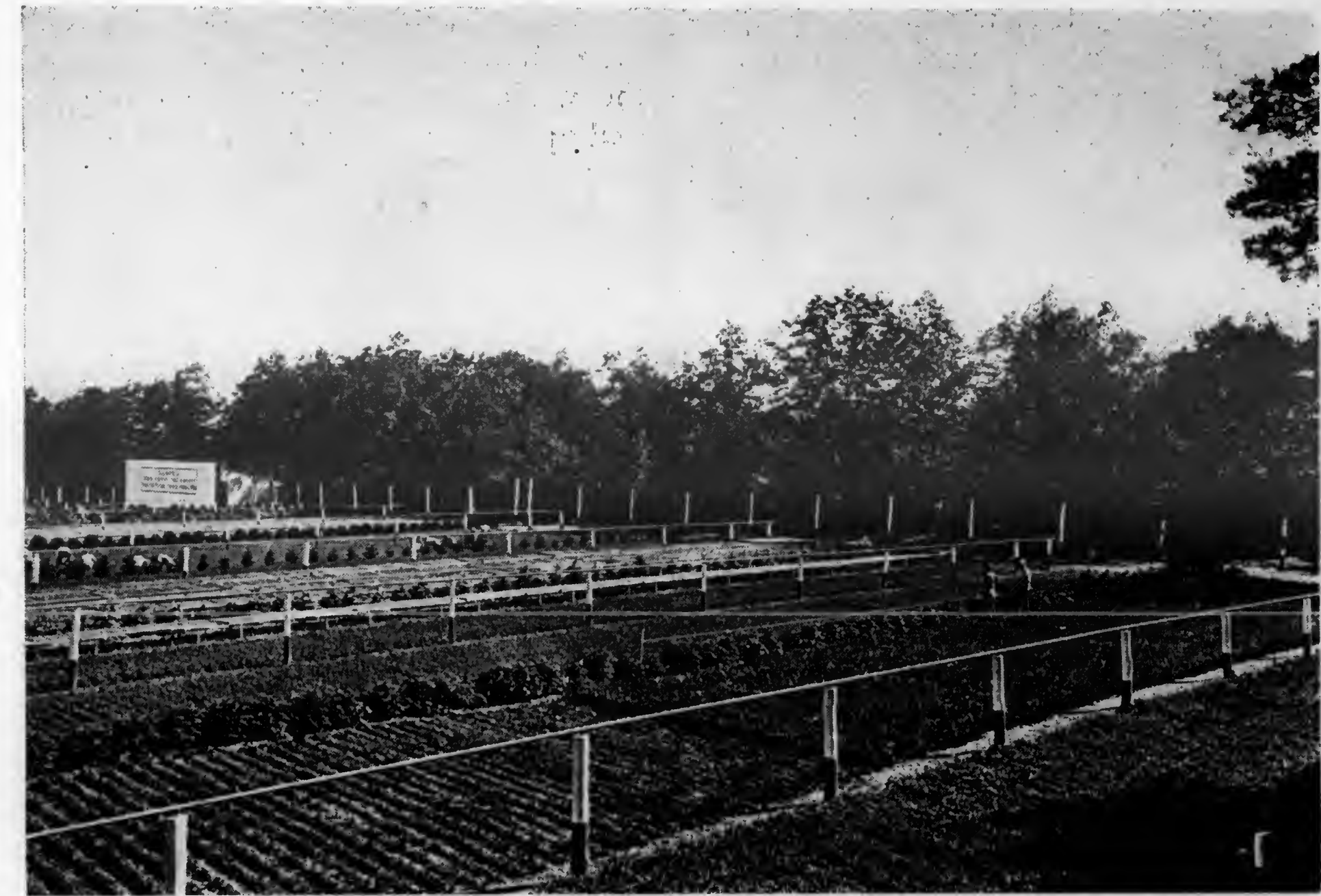
The total land area covers 28,692,480 acres of which 13,046,557 acres are in woodland. The forest area of Pennsylvania is almost equal to the combined forest areas of Italy, Switzerland, and Belgium, and equals one-half the forest area of France and Great Britain.

It became evident in the early days of Pennsylvania forestry that not much progress was possible until the State became the owner of a considerable acreage of forest land. The Pennsylvania Forestry Association was largely instrumental in having an act passed in 1897 authorizing the acquisition of forest land by the State. The first purchase of 17,000 acres was made on June 13, 1898. During the first five years the Commonwealth acquired 314,572 acres of forest land. In ten years the area of the State Forests had grown to 750,109 acres. The State Forest area today is 1,641,362 acres, distributed throughout 32 counties; and located chiefly in the mountainous parts of the Commonwealth. They have been acquired at an average price of \$2.43 per acre.

The purpose of the State Forests, according to law, is "To provide a continuous supply of timber, lumber, wood and other forest products, to protect the watersheds, conserve the waters, and regulate the flow of rivers and streams of the State, and to furnish opportunities for healthful recreation to the public."

The State Forests belong to the people of Pennsylvania for whom they are administered by the Department of Forests and Waters, and are open at all time for the enjoyment of the public. We cannot have forests unless we protect and care for them. Forest fires must be kept out of the woods. They must be used and treated wisely, not destructively, and productive waste lands must be put to

* Presented at 1932 summer meeting.



Courtesy Department of Forests and Waters.
A PORTION OF THE CLEARFIELD NURSERY

trees but better forest trees, trees that are free from fire scars, from worm holes, and from rot.

It is our social and economic duty to place our forests in order and to restore them to the production of useful wood, make them attractive, and keep them sanitary.

The most important work of the Department is the suppression of forest fires. Every other kind of work must give way to it while the fire season is on. The State has been divided into 24 districts, each in charge of a trained forester, who has direct charge of fire wardens, patrolmen, observers, and other employes. Forest protection is needed in every section of the State, for there is no part of the Commonwealth of Pennsylvania without forest land. The Department is doing its best to eliminate fire hazards and to hold responsible all persons who through carelessness or negligence cause forest fires.

One hundred and twenty-two forest fire observation towers have been erected in all parts of the State. These towers are of primary value in the quick detection and location of forest fires, and serve as vantage points

for exceptional views of Penn's Woods. Thirty-one of these towers are in the State Forests and 91 on private land. Fire observers are constantly on duty during fire seasons.

The production of quality timber depends first and foremost upon the solution of the forest fire problem. There can be no future for the lumber industry in Pennsylvania until forest fires are controlled. Another important activity in our forests that will result in the production of quality lumber is the removal of dead, down, crooked, and defective trees. Systematic improvement cuttings conducted on the State Forests during the last year as relief projects resulted in the removal of thousands of cords of wood. These operations materially reduced the fire hazard and made a marked improvement in the quality of the trees that remain.

The State Forests are traversed by approximately 3,000 miles of roads and 2,500 miles of trails. This road and trail system is valuable alike for fire protection and recreation. Besides these roads and trails, the Department maintains over 3,000 miles of forest boundary lines.

Four large forest tree nurseries are operated in the State Forests for the purpose of growing planting stock for reforesting both State owned and privately owned lands. These nurseries are located at Mont Alto, Franklin County; Clearfield, Clearfield County; Greenwood Furnace, Huntingdon County; and Pottery Mills, Centre County. Their annual production is approximately 9,000,000 forest tree seedlings.

More than 43,000,000 trees have been planted within the State Forests since the beginning of the reforestation movement in 1902. These plantations cover some 28,000 acres. Private land owners in Pennsylvania have set out 110,000,000 trees raised in the State Forest nurseries.

Within the State Forests are many of the best hunting grounds and finest fishing streams in Pennsylvania. Twenty game refuges are located in the State Forests. These public forests are enjoyed annually by more than 400,000 hunters and 150,000 fishermen. Nearly one-half of the deer, more than one-third of the bear, and large quantities of small game are killed annually in the State Forests, although they comprise little more than one-tenth of the State's entire forest area.

Nine State Forest Parks, eleven State Forest Monuments, and 50 Public Camp Grounds are maintained for the outdoor enjoyment of the people. These areas are equipped with tables and benches, fireplaces, pure water, parking space, and other facilities for the convenience of visitors. Well marked trails radiate from them into the surrounding forests. More than one and one-half million Pennsylvanians and tourists from other states visit these recreational areas annually.

More than twenty-seven hundred camps on the State Forests are leased to individuals, clubs, and other organizations of Pennsylvanians at nominal annual rentals. Summer homes, cabins, hunting lodges, and other buildings are erected on these sites by the lessees. One hundred and fifty thousand citizens annually are thus enabled to enjoy outdoor life in a forest environment and at moderate cost for extended periods each year.

Although the primary function of a forestry program is to grow timber crops on a sus-

tained yield basis, forestry attempts to do much more than this. Many other activities vital to the welfare and happiness of our people are tied up with a State-wide forestry policy. The protection and perpetuation of our woodlands are essential for the recreation and health of the thousands who annually seek vacations among the trees. Furthermore, the protection of water supplies, flood control, and the prevention of erosion are intimately dependent upon timberland areas.

It hardly seems necessary to mention the dependency of game and fish life upon the forests, because this association has been reiterated since the dawn of the conservation movement in this country. Yet it is an association that is too often forgotten, especially by some sportsmen who demand more and more game and fish but who neglect to include within their demands the preservation of the forests—the haven of all wild life.

Cut-over and waste lands in Pennsylvania, including abandoned farm lands, now total some four million acres. Because these lands are largely barren they yield no products, furnish no labor, and pay very little taxes. It has been demonstrated that a comprehensive reforestation project would bring back these lands to productivity, and it would have the added merit of being self-liquidating.

A motorist today driving through our State Forests and seeing the well stocked stands of second growth timber could hardly believe, if told, that one or two decades previously this land had supported little except fire scarred scrub oak, bracken, and shrubs. Protection from fire and reforestation during the past 30 years have caused this transformation. If such a complete change can be made within a few decades, surely it is a common sense policy to enlarge the scope of our reforestation activities and increase the efficiency of our fire control forces in order that we may completely bring back Penn's Woods.

A feature of the exhibit of the U. S. Department of Agriculture at the Century of Progress Exhibition is an actual mechanical demonstration of the contrast between the effect of rain falling on burned-over forest land and on similar land with a good stand of timber.



Courtesy Department of Forests and Waters.
PLANTATION OF WHITE PINE

THE NATIONAL FORESTRY SITUATION*

By W. B. McCaleb, Vice-President, The Pennsylvania Forestry Association and Director of American Forestry Association

IN discussing the conditions of forestry in the Nation, it is fitting that mention should be made of the work of the American Forestry Association. This organization does for forestry in the entire country what the Pennsylvania Forestry Association does for Pennsylvania—publishes a magazine, disseminates information and maintains an active interest in legislation affecting the forestry situation. With headquarters at the National Capital it maintains close contact with conditions in Washington, and through its membership in the different states is able to do much constructive work for forestry. It was the American Forestry Association which urged a thorough study of the entire forestry situation, with the following results.

*Presented at 1933 Summer Meeting.

A resolution was introduced in the Senate by Senator Copeland of New York and was passed on March 10, 1932. It requested the Secretary of Agriculture to make an investigation and recommend what should be done to improve the timber situation.

A comprehensive report was prepared by the U. S. Forestry Department and was submitted to the Senate by the Secretary of Agriculture on March 27, 1933.

The Secretary said in part:

That practically all of the major problems of American forestry center in, or have grown out of, private ownership.

That the forest problem ranks as one of our major national problems.

The problem of balancing the national timber budget centers largely in private ownership because four-fifths of the timber-growing land with 90 per cent or more of the possible growing capacity is privately owned. The practically universal tendency under private ownership is to reduce the forest capital or growing stock below the point where satisfactory growth is possible. The forest capital of the entire East, for example, where 96 per cent of

the forest land is still in private ownership, must be increased $2\frac{1}{2}$ times to permit growth adequate to meet national requirements, but the current drain from cutting and losses in the East exceeds growth by nearly 29 billion board feet annually. Furthermore, we must depend upon eastern forest lands for nearly 85 per cent of our forest growth.

The most critical factor in balancing the timber budget is the large saw-timber sizes, which take the longest time to grow and which now constitute 70 per cent of the drain on our forests. Drain in these sizes exceeds growth by five times.

A greatly enlarged public ownership offers the most effective solution in the public interest and that in the long run it will be much more than self-liquidating in direct and indirect returns.

The Department therefore fully endorses the conclusions reached, that public agencies should acquire 224 million acres of forest land including a part of the abandoned agricultural land now available, and place it under forest management at the earliest possible date following acquisition. A considerable part of this land has or will come into public ownership anyway by reason of tax delinquency. The States and their local subdivisions should take over as much of this acquisition program as their resources permit. The Federal Government should assume only that part which the States can not carry. It is believed that the resources of the States will be fully taxed to acquire and manage 90 million acres, leaving 134 million for the Federal Government.

In "The Forest Situation Exposed," (May, 1933, issue of "American Forests"), Mr. Ovid Butler, Executive Secretary of the American Forestry Association, has ably summarized the observations and recommendations of this report. So succinctly has this been expressed that we feel it should be the basis for our own summary, as follows.

"The public policy of passing excessive areas of forest land to private ownership," the letter of Secretary Wallace stated, "and the private cut-out-and-get-out policy, has wrecked or seriously reduced the productivity of the land, made it difficult or impossible to pay taxes, and hence has led to tax reversion so

large in several forest regions as to constitute virtually a breakdown of private ownership."

Convinced that reliance upon private ownership of forest land has clearly failed to assure forest welfare and social and economic stability, the report declares that the forest situation confronting the nation today calls for national planning in a large way. It outlines and urges immediate action upon a national and state program of forest land reconstruction that will make adequate provision for the country's future needs for wood, watershed protection, outdoor recreation, preservation of wild life, productive forest ranges, and forest research. The central feature of this program looks to the acquisition by the states and the Federal Government of public forests aggregating 224 million acres in addition to the area already held in public ownership. Completion of the program would place under public forest management a total of 400,000,000 acres. States and their local sub-divisions, the report declares, should take over as much of this acquisition program as their resources permit.

The forest lands of the United States, swelled within recent years by fifty million acres of abandoned agricultural land, today constitute over one-third of the land surface of the country. They exceed by 120,000,000 acres the entire area embraced within all the states east of the Mississippi River. They exceed the combined area of France, Germany, Norway, Sweden, Spain and Italy.

The total acreage represented by this vast domain of forest lands is 670,000,000 acres, 80 per cent of which, is in private ownership.

Remaining forests are being cut at the rate of 10,000,000 acres a year, and 98 per cent of the area is privately owned. Only about five per cent of the private cutting is done with any conscious regard to the future productivity of the forest or the land.

Progress in American forestry today has brought only about 110,000,000 acres under conscious forest management, other than fire protection.

Four-fifths of the remaining saw timber in the country, and nine-tenths of the old growth forests are in the West, while the large consuming markets are in the East and Middle West. About one-half of this supply, however,

is considered economically unavailable because of inaccessibility and other factors.

The problem of balancing the timber budget calls for doubling the growth of timber of all sizes for the country as a whole and for increasing the supply of saw timber trees by five times.

One-half of the total area of forest land in the United States is classified as having major watershed influence and nearly three-fourths as having either major or moderate influence. Research shows destruction or deterioration of the forests is one of the major contributing causes of rapid run-off and destructive floods. It shows that forests retard the rate of run-off, put waters into the soil and underground channels, reduce the height of floods, increase summer flows, and deliver waters free from sediment.

Private ownership of forest or of agricultural land is responsible for practically all of the critical watershed problems of the East and a substantial part of those of the West.

Recognition of the value of forests for recreation is in its infancy. Ultimate possibilities of social benefits through forest recreation are little appreciated. Even today, the American people are spending about two hundred and fifty million man days a year in forest recreation and are expending not less than \$1,750,000,000 annually. In view of the fact that so large a proportion of the forest lands are in private ownership, it is highly questionable if the future recreational needs of the nation can be met except through expansion of public ownership.

In regard to forest planting, a twenty-year planting program is recommended based on the most urgent watershed and forest situations. This program would seek to plant twenty-five million acres, nine-tenths of which are in the East. The cost would approximate \$172,000,000.

Public regulation of the lumber industry or the private owner is not advocated except in modified form. The report questions that nation-wide public regulation will accomplish the required ends, but states that some regulation, both by states and the Federal Government, will be necessary as a concurrent effort. The principal features of the national plan recom-

mended may be summarized as follows:

1. Expansion of public ownership of forest lands so as to bring under public management slightly more than half of the commercial forest lands, five-sixths of the non-commercial forest lands, three-fifths of the forest ranges, four-fifths of the area of major influence on watershed protection, and eight-ninths of the area to be set aside for forest recreation. This would call for the acquisition of 224,000,000 acres which added to the forest lands already in public ownership would bring public holdings up to approximately 400,000,000 acres. It is recommended that of the additional land to be acquired, 177,000,000 acres be in the East, and 47,000,000 acres in the West. The program would leave for private endeavor in forestation 255,000,000 acres of land especially adapted to commercial timber growing.

2. An expansion of public aid to the states and other private owners based on an equitable adjustment between federal and state government and gauged by public interest.

3. Public regulations that would cover generally accepted requirements, attempt nothing impossible and be available as a reserve measure in case of future public necessity.

4. Federal assumption of only that part of the undertaking which other agencies can not or will not carry.

The annual cost to the public of carrying out the program recommended, it is estimated, would be as follows:

First five-year period.....	\$117,000,000
Second five-year period.....	143,000,000
Third five-year period.....	110,000,000
Fourth five-year period.....	94,000,000

Total..... \$464,000,000

This describes the conditions in the Nation and demonstrates the results of private indifference to protection and restoration of timber lands. The report is voluminous, but well deserves the careful reading of those who realize the importance to the Nation of a suitably planned and executed forest policy.

DISCUSSION.

MR. RICHARDS: The Copeland Report demonstrates how the past policies of private ownership of forests have been shown to be

not the best methods. This is illustrated in Pennsylvania, where virgin timber tracts were cut wholesale, followed by complete abandonment of the areas and of the timber towns. We must consider that we have come now to a stopping point and a change in methods.

Opposed to our actions of denuding and deserting land is the European attitude that no land should be allowed to lie idle and waste—if not farmed it is used to grow trees. Public policy has learned that the best social practice is to use poor land for forests.

The Winterthur City forest, which I saw when in Switzerland, was started as a forest in 1274. In 1931 it yielded a profit of \$9.41 per acre.

Similarly we must look at forests from the social point of view, and plan for future needs by planting trees which we, as individuals, never expect to see grown to maturity.

MR. WOOLMAN: This discussion recalls that through the efforts of this Association there was recently passed and enacted a bill enabling counties to acquire tax-delinquent land for forest purposes, thus enabling the restoration to productivity of large trees which heretofore have existed without use or utility to anyone. This Association and our Legislature are thus one step ahead of the Cope-land Report.

A while ago my brother and I inquired about a tract of land which had long ago been given by William Penn to the city of New Castle, Delaware, as a forest game preserve. But the people had been permitted to kill all the game and then to cut down the trees. This was followed by desultory farming, and there now remains only an acreage of exhausted soil. This land was offered to us for any purpose whatever, just so that it would be brought again into some kind of production.

At a special meeting of the Board of Directors of the American Forestry Association on June 27th, a resolution was adopted, stating their accord with the purpose of the Industrial Recovery Act. One paragraph of the resolution says: "The American Forestry Association views the Industrial Recovery Act as an unparalleled opportunity to begin rehabilitation of the forest industry along sound lines

of economic stability, sustained yield management of resources and general public welfare. It believes that the authority given the industry to control production obligates it to exercise that authority in a way that will guarantee to the American people the conservation of the forest resources upon which permanent industry is dependent and from which public benefits flow in many diverse channels of American life."

SIMON B. ELLIOTT

THE cover plate of this issue reproduces the bronze marker on a native boulder, recently dedicated to a man who by his personality and his work earned the affection and esteem of all who knew him. In the tumult and changes that have occurred since his useful work was ended, new personalities have been brought to our notice—and many of these, and their deeds, are already forgotten. But this noble citizen is well remembered, and the marker was the tribute of those who had known him, and who recognized that the foundation he builded will endure through generations.

From the *Service Letter* we excerpt: "In his early life Mr. Elliott lived among and appreciated the glories of the primeval Penn's Woods, and he soon came to recognize the folly of their wasteful exploitation. The warnings sounded by him as to the consequences of a deforested State merited and received respectful consideration by all who heard him. His deep interest in forestry led to travels through the United States, Canada and Europe. . . . Mr. Elliott was one of a group of indefatigable contributors to the forest literature of the first two decades of the 20th century. Many and frequent were his sound discussions of current forestry problems in *Forest Leaves*, the official organ of the Pennsylvania Forestry Association.

"It is an interesting commentary upon Mr. Elliott's vision and his keen perception of sociological and forestry trends that he so often foresaw crises which a decade or two later became matters of great public concern. For example, we in Pennsylvania to-day are greatly concerned by the tax delinquent land



Courtesy Department of Forests and Waters.
MARKER TO HON. SIMON B. ELLIOTT

problem and, particularly, with the reforestation of extensive areas of denuded forest and abandoned farm land, so essential if they are ever to yield products and taxes. Writing in the June 1911 edition of *Forest Leaves*, Mr. Elliott foresees this problem arising, and characteristically, attempts to meet it. It will come as a revelation to those to whom the idle land problem in Pennsylvania has only recently become a conservation issue to read his interesting comments. . . .

"In 1912 appeared Mr. Elliott's long awaited book, *The Important Timber Trees of the United States*. . . . Although many books on trees and forestry have since appeared, this continues to be a standard reference work on the subject.

"As long as trees grow in Penn's Woods Mr. Elliott will be remembered for his valuable services to the Commonwealth and to the promotion of forestry. He was a man of high moral character and great intellectual endowments."

In a telegram read at the memorial exercises, Governor Pinchot said "Let me express my

deep regret that I cannot be present at the dedication of the Elliott memorial, and my profound admiration and respect for Mr. Elliott. I knew him for many years, during which my appreciation of his devotion to a great cause steadily grew. He was a crusader who carried his crusade through to the very end of his life."

TRIBUTE TO SIMON B. ELLIOTT

By Hon. J. Lyon Harris

WE are gathered here this beautiful summer day to perpetuate the memory of one of the Pioneers in the Forest Conservation movement of Pennsylvania. It is fitting that this spot is chosen for the exercises connected with the dedication of a marker in his honor, for it was largely through his efforts and perseverance that this splendid Nursery, which stands as a living monument to him, was located here.

Mr. Elliott was a modest man. He cared nothing for the applause of the gallery, and even less to be in the limelight. But I know

not the best methods. This is illustrated in Pennsylvania, where virgin timber tracts were cut wholesale, followed by complete abandonment of the areas and of the timber towns. We must consider that we have come now to a stopping point and a change in methods.

Opposed to our actions of denuding and deserting land is the European attitude that no land should be allowed to lie idle and waste—if not farmed it is used to grow trees. Public policy has learned that the best social practice is to use poor land for forests.

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Similarly we must look at forests from the social point of view, and plan for future needs by planting trees which we, as individuals, never expect to see grown to maturity.

MR. WOOLMAN: This discussion recalls that through the efforts of this Association there was recently passed and enacted a bill enabling counties to acquire tax-delinquent land for forest purposes, thus enabling the restoration to productivity of large trees which heretofore have existed without use or utility to anyone. This Association and our Legislature are thus one step ahead of the Cope-land Report.

A while ago my brother and I inquired about a tract of land which had long ago been given by William Penn to the city of New Castle, Delaware, as a forest game preserve. But the people had been permitted to kill all the game and then to cut down the trees. This was followed by desultory farming, and there now remains only an acreage of exhausted soil. This land was offered to us for any purpose whatever, just so that it would be brought again into some kind of production.

At a special meeting of the Board of Directors of the American Forestry Association on June 27th, a resolution was adopted, stating their accord with the purpose of the Industrial Recovery Act. One paragraph of the resolution says: "The American Forestry Association views the Industrial Recovery Act as an unparalleled opportunity to begin rehabilitation of the forest industry along sound lines

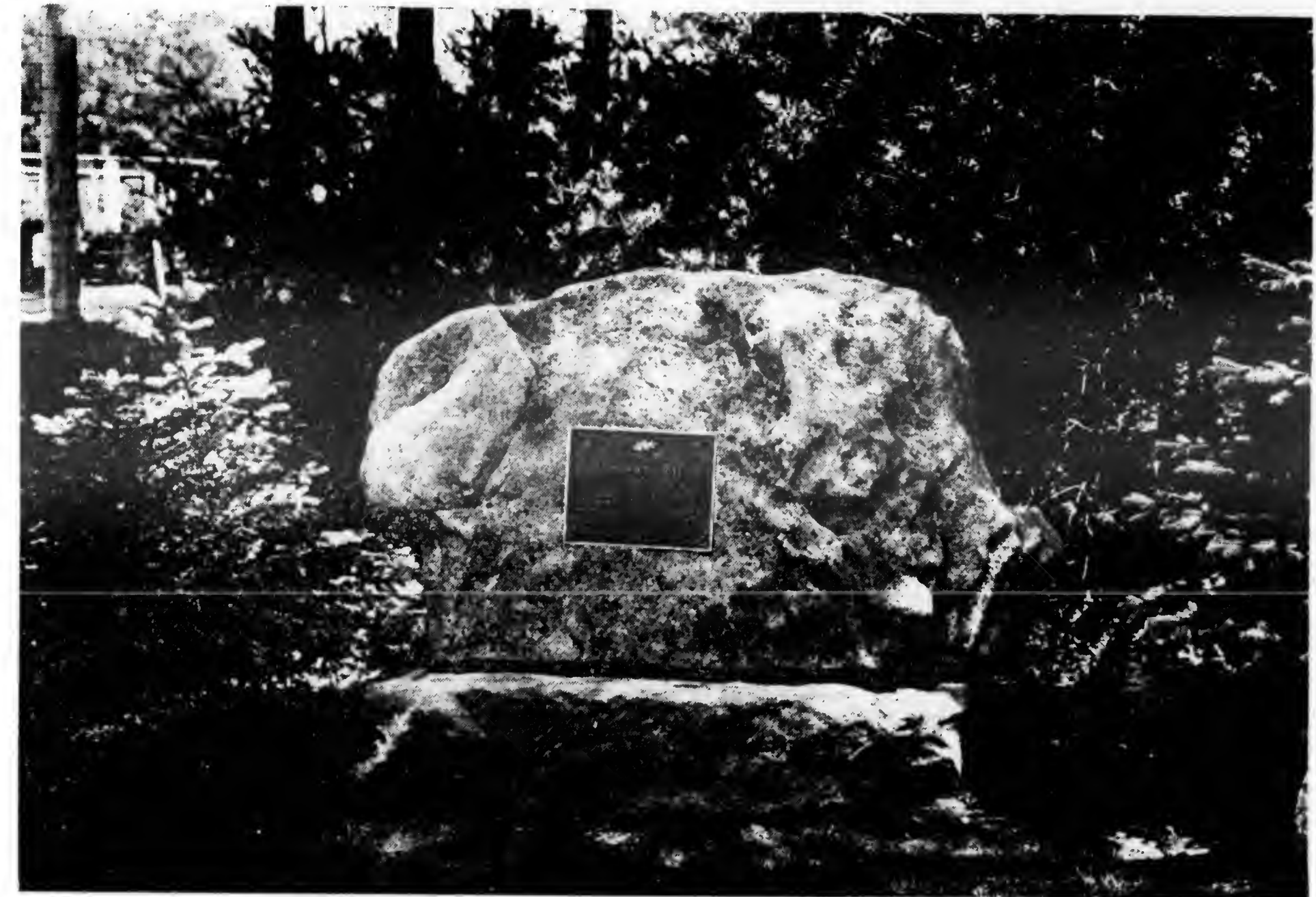
of economic stability, sustained yield management of resources and general public welfare. It believes that the authority given the industry to control production obligates it to exercise that authority in a way that will guarantee to the American people the conservation of the forest resources upon which permanent industry is dependent and from which public benefits flow in many diverse channels of American life."

SIMON B. ELLIOTT

THE cover plate of this issue reproduces the bronze marker on a native boulder, recently dedicated to a man who by his personality and his work earned the affection and esteem of all who knew him. In the tumult and changes that have occurred since his useful work was ended, new personalities have been brought to our notice—and many of these, and their deeds, are already forgotten. But this noble citizen is well remembered, and the marker was the tribute of those who had known him, and who recognized that the foundation he builded will endure through generations.

From the *Service Letter* we excerpt: "In his early life Mr. Elliott lived among and appreciated the glories of the primeval Penn's Woods, and he soon came to recognize the folly of their wasteful exploitation. The warnings sounded by him as to the consequences of a deforested State merited and received respectful consideration by all who heard him. His deep interest in forestry led to travels through the United States, Canada and Europe. . . . Mr. Elliott was one of a group of indefatigable contributors to the forest literature of the first two decades of the 20th century. Many and frequent were his sound discussions of current forestry problems in *Forest Leaves*, the official organ of the Pennsylvania Forestry Association.

"It is an interesting commentary upon Mr. Elliott's vision and his keen perception of sociological and forestry trends that he so often foresaw crises which a decade or two later became matters of great public concern. For example, we in Pennsylvania to-day are greatly concerned by the tax delinquent land



Courtesy Department of Forests and Waters.
MARKER TO HON. SIMON B. ELLIOTT

problem and, particularly, with the reforestation of extensive areas of denuded forest and abandoned farm land, so essential if they are ever to yield products and taxes. Writing in the June 1911 edition of *Forest Leaves*, Mr. Elliott foresees this problem arising, and characteristically, attempts to meet it. It will come as a revelation to those to whom the idle land problem in Pennsylvania has only recently become a conservation issue to read his interesting comments. . . .

"In 1912 appeared Mr. Elliott's long awaited book, *The Important Timber Trees of the United States*. . . . Although many books on trees and forestry have since appeared, this continues to be a standard reference work on the subject.

"As long as trees grow in Penn's Woods Mr. Elliott will be remembered for his valuable services to the Commonwealth and to the promotion of forestry. He was a man of high moral character and great intellectual endowments."

In a telegram read at the memorial exercises, Governor Pinchot said "Let me express my

deep regret that I cannot be present at the dedication of the Elliott memorial, and my profound admiration and respect for Mr. Elliott. I knew him for many years, during which my appreciation of his devotion to a great cause steadily grew. He was a crusader who carried his crusade through to the very end of his life."

TRIBUTE TO SIMON B. ELLIOTT

By Hon. J. Lyon Harris

WE are gathered here this beautiful summer day to perpetuate the memory of one of the Pioneers in the Forest Conservation movement of Pennsylvania. It is fitting that this spot is chosen for the exercises connected with the dedication of a marker in his honor, for it was largely through his efforts and perseverance that this splendid Nursery, which stands as a living monument to him, was located here.

Mr. Elliott was a modest man. He cared nothing for the applause of the gallery, and even less to be in the limelight. But I know

of no one in his time who did more for the propagation, protection and preservation of the forest of Pennsylvania than he. It was my great good fortune to have been associated with him for a number of years as a member of the Pennsylvania Forestry Commission, and during that time I learned to esteem and admire him. Esteem him for the man he was and admire him for his keen grasp and clear understanding of the Forestry situation as it then existed in the Commonwealth. He was a lover of nature, the forest was his Cathedral, the trees his companions and he loved them.

In closing I want to recall a remark that my sainted mother made after Mr. Elliott and I had paid a short visit to her home in Bellefonte. She said to me, "You must always bring Mr. Elliott with you and make our home his home when in Bellefonte, for he is such a dear old Gentleman." Her remark portrays the true character of the man, he was indeed a gentleman. To know him was to love him. I am glad to have had this opportunity of paying a tribute to one whom I greatly admired, and who was a very dear friend.

Extracts from remarks of Mr. E. W. Hess

"He told of looking over the desolation of the forest caused by fires. And his firm conclusion was that the way to reforest this and similar 'deserts' was by growing tree plants from seeds and planting the burned over areas. And this message he carried to Members of the Assembly, to Governors, to heads of corporations, and everyone who would listen—then use their influence. And he got the legislation, and knew that it was good. And he did this, not by blowing of trumpets, not by self advertising (that was so far from his make-up) but just because he knew it would be 'for the good of his people' . . .

"That we should here today dedicate this slight Memorial to him and his work is most fitting; that we should have planted here to his memory one of the tall straight hemlocks that he loved so well is also most fitting. But his memorial is in the great work he has done for the people of his land. . . . Of him it can be said:

"Not as a ladder from Earth to Heaven,
Not as an Altar to any creed,
But simple service, simply given,
To his own kind, in their common need."

Address by W. B. McCaleb

IN THE main corridor of the State Capitol Building at Harrisburg there was placed a few years ago a tablet to the memory of Dr. John T. Rothrock—for many years President of the Pennsylvania Forestry Association, and who was familiarly known as the "Father of Forestry" in the State. This honor was well deserved for his outstanding and unselfish life-long work in the interests of Forestry. It has long been the custom to erect statues and monuments in honor of soldiers and statesmen, but this was the first instance where similar recognition was given to one who labored for the preservation and upbuilding of our forests solely for the benefit of all the people of the State.

Today we are gathered to dedicate a second tablet to a forester, and to do honor to another one of our number who is also well deserving of recognition, and, as representing the Pennsylvania Forestry Association, I wish to pay grateful tribute to his memory.

Mr. Elliott was for many years an active member of the Association and was most helpful, particularly through his contributions to our publication the "Forest Leaves." Many of his articles showed vision and as time goes on his prophecies are shown to have been true.

Devoted as he was to the forests and knowing and loving trees as he did, it seems to me that this is a fitting place to erect this tablet, near the forest trees and out in the open where he will in a sense share with them the sunlight, the stars, the rain, and the snow. As time passes each tree in turn will pass, but Mr. Elliott's contribution to the cause of Forestry will last forever, and the Pennsylvania Forestry Association should follow along the path which he has blazed leading to full recognition of the benefits of forests to mankind.

"He husbands best his life, that freely gives
It for the public good; he rightlly lives."

RECREATIONAL USE OF WOODED AREAS

IN an article on Public Recreation, Hon. Lewis E. Staley, Secretary of the Department of Forests and Waters, discussed the growing use of our wooded regions for various recreational purposes. Reference was made to the income of over a million and a half dollars annually which accrued to the State from licenses for hunting and fishing, both dependent on forests, and from State Forests for other recreational uses. He said:

"Public recreation in Pennsylvania is being recognized as one of the outstanding features of State and private forest land development. The progressive forester has had to recognize forestry in a much broader sense than growing timber. In its truest and broadest sense it is a combination of all those activities and benefits which accrue from the preservation and development of a satisfactory stand of tree growth. The average citizen cannot visualize the wood problem and what is involved to solve it, but he can very clearly see the advantage of forestry in forms of land use such as hunting, fishing, camping and other varied forms of wood life."

On May 11, 1932, the President of Mexico signed a decree requiring the artificial reforestation of timberland by those who remove the timber when:

Natural reforestation is impossible.

Natural regeneration has caused the degeneration of the trees.

The complete clearing of the land is justified, providing it is not devoted to agriculture.

The annual exploitation exceeds certain specified limits for certain type of woods and wood products.

The decree states that the principal object of the reforestation is the replacement and improvement of the species whose exploitation has been authorized.

For two years Rumania has been engaged in restoration to forests of unproductive lands. The total area planned for improvement approximates a quarter-million acres.

MONTEREY CYPRESSES TO BE PRESERVED

ON two rocky headlands, Cypress Point and Point Lobos, on the California coast, grows the Monterey Cypress. At no other locality is this tree found. Maintaining existence on rocky knobs and cliffs, exposed to ocean winds and storms, these trees appeal by their picturesqueness, as well as their rarity. Battlers of the elements, clinging to their small corner of the earth, they emphasize to the beholder that theirs is a "last stand."

Fortunately these rarities and the immediate area are to be preserved. The State of California has authorized a \$600,000 bond issue to purchase most of the area, and public spirited citizens are seeking to obtain an additional \$100,000 to purchase another 100 acres. Completion of the plan would assure a 500 acre tract, with a coast line of three and one half miles, to be preserved in its natural primitive state, and to be a permanent sanctuary for the only known stand of Monterey Cypress.

Assistant Forester John W. Tyler, in an article on the Wood-Using Industries of Pennsylvania, has brought out the following data, which well substantiates the advocacy of more forests in the State:

More than four-fifths of the lumber used in the State is imported.

The transportation cost of imported lumber averaged two and a half times as much as for lumber grown in the State.

In two decades the employees in the wood-using industries of the State fell from 100,000 to slightly over 25,000.

About half the wood used is soft wood, and our growing stands of trees are 90 per cent. hardwoods. The cut of white pine dropped from one-sixth to one-sixteenth of the total cut.

In 1932 there were 1,308,275 trees planted on 1,036 acres in the State Forests, making a total, since planting was begun in 1899, of 41,228,000 trees set out on public lands. The average total cost of this work last year was \$10.65 per acre.

SECRETARY WALLACE FAVORS SUSTAINED FOREST YIELDS

In a recent letter to Dr. Wilson Compton, Secretary of the National Lumber Manufacturers Association, Secretary Wallace said: "The President asks me to tell you that he trusts any code relating to the cutting of timber will contain some definite provision for the control of destructive exploitation."

"The justification for this position," the Secretary's letter continued, "lies in the declared policy of the Industrial Recovery Act to conserve natural resources. It lies also in the fact that sound and lasting industrial recovery in the forest industries can be brought about only by practices that will insure the perpetuation of the basic forest resource and hence be in the highest interest of both the industries themselves and the general public."

On June 9th the National Forest Reservation Commission approved purchase of forest land by the Federal Government totalling 443,909 acres, at an average cost of \$1.70 per acre. These lands are within 28 existing National Forests and in 16 states; the purchase for the Allegheny National Forest in Pennsylvania being 4,815 acres. Again on June 20th further purchases were approved for 225,649 acres, at an average cost of \$2.08. This second purchase adds an additional 4,241 acres to the Federal holdings in this State.

The American Tree Association reports that as a part of the National Nut Tree Planting Project, which they originated and fostered, there were a million walnuts collected for spring planting. This project has a dual purpose: to help restore native nut trees to farm yards, school and camp grounds and forests, and to memorialize American shrines by planting nuts gathered from such locations as Mount Vernon, Arlington, Gettysburg and Vicksburg, and the homes of many of America's illustrious men and women.

Included in these activities was the gathering of more than 170 bushels of walnuts from the Gettysburg battlefield, by the Boy Scouts of Adams County.

A GHASTLY RECORD

Forest Bankruptcy in America, by Lt. Col. George P. Ahern, with a foreword by Honorable Gifford Pinchot. 319 pp. 1933. Published by the Green Lamp League, 1319 F Street, N. W., Washington, D. C. \$2.00.

EACH State's story of forest bankruptcy is told in Colonel Ahern's latest book with such candor and with such a wealth of supporting data, that there no longer remains any validity to the assertion that the principles of forest conservation are without the scope of interest of "the man in the street."

In the national economic shuffles of the past three years we have been so insistent upon solving first the problems of employment and business recovery that we have almost forgotten that there are problems concerning our natural resources, particularly forests, that bear directly upon the wise use of the unemployed. This book states "this forgotten problem" so clearly that not only the conservationist, but even "the forgotten man," may be induced to tackle it.

Colonel Ahern's book is particularly important because it appears at a time when there is great public interest in the problems that the author discusses. It ties in directly with President Roosevelt's proposal to undertake a colossal project financed by the sale of government bonds and directed toward the employment of our nation's jobless. For that reason the publication of "Forest Bankruptcy" is fortuitously timely, and no person alive to the significance of reforestation as a public work can afford to neglect the wealth of information that Colonel Ahern has assembled.

In many respects the reader will find this a disturbing book. The picture presented is more often than not a dark one. The wholesale exploitation of our timber stands is only part of it. The lack of a national policy to permit the management of the remaining forests is, if possible, the worst part of the situation,—the part that calls down the author's most biting criticism.

Do not hesitate to read this book for fear that it may prove too technical. Colonel Ahern writes with a soldier's style—brief, clear, and to the point.

HENRY E. CLEPPER.

DEPARTMENT OF FORESTRY STATE COLLEGE

FOREST LEAVES

OCTOBER 1933



PHILADELPHIANS IN PENN'S WOODS (PROMISED LAND)

PUBLISHED BY THE
PENNSYLVANIA FORESTRY ASSOCIATION
PHILADELPHIA, PA.

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THE PENNSYLVANIA FORESTRY ASSOCIATION FOUNDED IN JUNE, 1886

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

ANNUAL MEMBERSHIP FEE, THREE DOLLARS
LIFE MEMBERSHIP, FIFTY DOLLARS

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 306 Commercial Trust Building, Philadelphia.

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ROBERT YOUNG STUART

THE DEATH of Major R. Y. Stuart, Chief of the United States Forest Service, has grieved his many friends and ended a notably useful and helpful career in forestry. His superior, Secretary Wallace, said: "His death is a great loss to all of us, both personally and officially. He was an efficient, highly respected public servant, not only in the national task of rehabilitating our forests, but also in the new and strenuous work of guiding the forestry work of the Civilian Conservation Corps and of helping with many phases of the public works program."

A native of Pennsylvania, Major Stuart graduated from Dickinson College, from which he received the honorary degree of Doctor of Science in June of last year. Subsequently he attended the Yale Forest School, and on graduation in 1906 entered the United States Forest Service, then but a year old. To this he devoted his subsequent life, with two exceptions. First when he served as an officer in the Forest Engineers of the A. E. F., for which work he received a citation from General Pershing. Later he was Deputy Commissioner of Forestry and then Secretary of the Department of Forests and Waters of Pennsylvania. His work and record while serving our State are well remembered both in and beyond the Department. On leaving this he said, "My seven years in the public service of Pennsylvania have been the happiest and richest of my life."

Returning to the National Forest Service he later became its head, and was responsible for many achievements. He developed a co-operative policy between Federal, State and private interests, established primitive and natural areas, modernized the grazing policy and was active in the Forest Taxation studies; while under his direction was prepared the recent report which delineated a national plan for forestry.

From the many high tributes paid we quote Governor Pinchot, who said, "He was a kindly and considerate gentleman and a man of good will in the finest sense. His death is a serious loss, not only to his friends, but to the profession in which he had rendered great services. He was my friend for nearly 30 years, and his departure is a deep and lasting sorrow."

Secretary Staley wrote, "There is not a fire warden, ranger or forester in Pennsylvania who knew Major Stuart, who did not recognize him as a friend, respect him as a superior officer, and admire his complete grasp of the many problems of forest conservation to the solution of which he so unselfishly and untiringly devoted his magnificent strength of body and understanding mind. Pennsylvania and the nation has suffered a great loss. We can most fittingly perpetuate the memory of him whom we all loved and respected by conscientiously carrying on his work so well begun."

He was for years a member of the Pennsylvania Forestry Association which always had his co-operation and support. At a meeting of the Council the following resolution was presented and unanimously approved.

RESOLVED, That the Council of The Pennsylvania Forestry Association desires to record its high appreciation of the valuable services to forestry which Robert Y. Stuart has given to our State and to our Nation;

That it also wishes to recognize the breadth of knowledge, the able administration, the ceaseless energy and the sympathetic understanding which had characterized his work;

And that it further records the personal loss felt by those who had known him;

And that we express to his family our friendly sympathy in their bereavement;

Also that copies of this resolution be sent to Mrs. Stuart and to the United States Forest Service and to the Department of Forests and Waters of Pennsylvania, and that the text shall be printed in FOREST LEAVES.

THE NEW NATIONAL FORESTER

Secretary Wallace has appointed, with Presidential approval, Mr. Ferdinand Augustus Silcox to be Chief Forester of the U. S. Forest Service, succeeding the late Major Stuart.

A native of Georgia, Mr. Silcox graduated from the College of Charleston and from the Yale Forest School, then entering the national Forest Service. In this he advanced to become a District Forester in the northwest, and after 6 years in this position entered the Forest Engineers Branch of the A. E. F., in which he was promoted to the rank of major. Subsequently he was Director of Industrial Relations for the commercial printing industry and then for the New York Employing Printers' Association.

Mr. Silcox enters his new position with the good wishes from a large acquaintance in the national service, to which we add those from the Pennsylvania Forestry Association.

In a note regarding the National Nut Tree Planting Project, printed in the last issue, an error was made in not giving credit for the idea to the American Forestry Association, whose original and continuing work in this we are glad to recognize.

The airplane, which has familiarized the public with upward air currents and strong wind velocities at high elevations, has been used to verify these effects on the transportation of plant and tree enemies. Flying at elevations up to 18,000 feet, Mr. F. C. Meier of the U. S. Department of Agriculture, collected various insects, seeds and spores, many of them injurious. Naturally these were more numerous in the lower levels, but the presence of such creatures as leaf-hoppers 2 miles up and of smaller animals and fungus spores a mile higher gave an index of the transporting effect of winds and the resulting spread of such enemies to our farm and forest crops.

"True conservation policy is not an anodyne hiding away our evil from us in a brief forgetfulness. It looks to the long future of a nation, and dares the heroic remedy where it is scientifically sure of the nature of the disease."

—JAMES RUSSELL LOWELL.

By an agreement with the United States Forest Service, the Game Commission has established a 400 acre game refuge in the Allegheny National Forest.

FOREST GROWING STOCK AND GROWTH IN FINLAND, SWEDEN AND NORWAY, AND AN ESTIMATE FOR PENNSYLVANIA

By Dr. E. A. Ziegler, Director Pennsylvania Forest Research Institute

WITHIN the last few years Finland, Sweden and Norway have completed national forest surveys for determining the producing forest area, the total stand of timber, and the total growth, as well as the average growing stock and volume increment per acre, by species. Yrjo Ilvessalo of the Finnish Forest Institute has prepared a comparison of these surveys with an English summary, containing the following data converted to cu. ft. and acre basis. Estimates for Pennsylvania are added.

TABLE 1. *Producing Forest Area*

Country	Total Forest Area (Mill. Acres)	Percent of Total Land (percent)	Per Capita (Acres)
Norway	18	24	6.2
Sweden	57	57	9.4
Finland	57	67	15.4
Pennsylvania	*13	45	1.4

* About 2 million acres of this is at present classed as not commercially stocked.

The figures should generally be correct within a probable error of less than 3 per cent. The costs were Norway .8 cents per acre (some compilation and publication costs to be added); Sweden .6 cent per acre; and Finland .06 cent per acre. Finland with more uniform topography ran its survey strips 7.5 to 19.5 mi. apart; Sweden 3.7 to 15 mi. and Norway 3.7 to 6 mi. apart, because of the less uniform forest. Finland also cut down on measurements by taking calipered plots at fixed distances, while the others calipered continuous strips. In Sweden and Norway each 50th tree on the strip was bored (increment auger) for age and rate of growth. In Finland a less proportion.

TABLE 2. *Growing Stock*

	PER ACRE		Conifers 8 in. and Over Cu. Ft.	PERCENTAGE		
	Total (Mill. Cu. Ft.)	Total Cu. Ft.		Pine %	Spruce %	Birch %
Norway	11	590	250	28	54	15
Sweden	50	850	370	41	42	13
Finland	48	840	330	48	30	19
Pennsylvania*	6.5	500*	50	Pines 10 Hemlock	—	All hard woods 90

* Estimate by the compiler. A forest estimate of 1924 by the Department of Forests and Waters gave 770 cu. ft. growing stock which appears excessively high for our cut-over and burned lands.

It is noteworthy in Table 1 that Pennsylvania has but 1.4 acres of forest per capita against 6 to 15 for these Scandinavian countries. Table 2 would indicate our total growing stock per acre as 60 per cent as good as that of Sweden and Finland and 85 per cent of that of Norway. It appears that this revised Pennsylvania estimate may be still too high. Even at that the fact remains that most of our growing stock is hardwood—much of which will never make saw timber.

TABLE 3. *Annual Forest Growth*
Annual Increment (peeled)

	Total (Mill. Cu. Ft.)	Per Acre (Cu. Ft.)	Per Capita (Cu. Ft.)	Percentage Growth (Percent)
Norway	350	19.3	123	3.18
Sweden	1,680	28.5	275	3.36
Finland	1,560	27.3	435	3.25
Pennsylvania	325	25.0	33	*5.0

* This percentage falls as the young timber reaches a higher average age, because of the increasing amount of wood growing-stock on each acre.

The above data for the Scandinavian countries is based on forest surveys and has a probable error within 3 per cent. The Pennsylvania estimate may well be 30 per cent off, but it is still sufficient to point an important truth. *The per capita forest growth in Pennsylvania is far below 50 cu. ft. of wood which is the quantity even the poverty stricken European nations set as the limit of self support.* While the Scandinavian countries export wood, Pennsylvania will always be a timber importing state with its higher standards of living. Its forest owners can depend on a freight advantage in growing timber, provided they do not throw all their young timber on the market in small sized forms which have a limited

demand such as mine timbers, and R.R. ties, causing over production in these, and leave many other markets such as lumber, poles, veneer logs and the higher priced wood products relatively untouched. In other words, *diversification* in forest products is just as necessary as in farm products for the general welfare of forest owners.

Our National Forest Survey, which is completed in the Pacific States and is now centering in the Southern States, will, in the next decade, reveal definitely for Pennsylvania, what its forest stocking and wood growth are. Its authoritative results will undoubtedly increase the demand for an expanded government forest policy for the poorer and more isolated forest lands, and a speedier reforestation of our idle farm lands, in order that we may approach more nearly self support in our wood supplies.

How serious a forest fire can be was shown by that in Tillamook County, Oregon, this past summer. High winds caused the initial spread and its further extension when nearly under control. The standing lumber killed amounted to nearly as much as the total cut for the entire country in 1932, and the majority was old growth Douglas fir. Most of the state's virgin forests of this valuable tree were in the burned area of more than 300,000 acres. The financial loss to the State is estimated at \$200,000,000.

"Large game requires several types of forest growth, and most small game species require some forest growth."—*Pennsylvania Game News.*

DEDICATION OF HISTORIC OAK TO DR. DRINKER

ON AUGUST 19th two hundred friends of our President Emeritus and of forestry, with representatives of historical societies and of Lehigh University, the Department of Forests and Waters, the Valley Forge Park Commission and the Pennsylvania Forestry Association, assembled at King of Prussia for the dedicatory exercises.

Vice-President McCaleb, as Chairman, stated the purpose of the meeting, and announced the opening address by President Smedley.

"Members of the Pennsylvania Forestry Association are gathered here this afternoon, in company with interested friends and neighbors, to dedicate a white oak to our former President, Dr. Henry Sturgis Drinker.

"He is one who has contributed a large portion of his life and energies to the protection, not only of the trees of Pennsylvania, but of those throughout our country.

"It is most fitting that this tree should be selected for this purpose, situated as it is almost within the bounds of one of the most hallowed spots of our Nation, Valley Forge Park. Along this highway the founders and early defenders of our Nation passed to and fro. This tree witnessed their privations and sufferings. We can image the spirit of one of them returning today to say:

"When I was young it sheltered me.

Woodman spare that tree!"

"This tree was standing when the founder of our Commonwealth, William Penn, was born. During its span of life it has seen many generations come and go. This great tree was a sapling long before the white man appeared over yonder hill. The American Indian dwelt hereabouts, unmolested, never dreaming of a day when he would have to give up his long cherished hunting ground and find a new one toward the setting sun.

"This tree has witnessed all the struggles, prosperities and depressions of our national life. It is a worthy representative of the oldest living thing on earth—the tree. Yet time will eventually see its passing; but while it stands may serve to recall the work that Dr. Drinker has done for the preservation of one of our greatest national assets—the Forest.

"The Pennsylvania Forestry Association is greatly pleased to officiate on this occasion, which is most interesting to us. Possibly some of you have never heard of our Association. To those I would say that we have never gone about 'with a brass band' or 'blowing our own horns.' Simply 'sawing wood' in our own quiet way for the past 50 years, at the same time we have been interested in the planting of many millions of trees. If you would like to know more about us, just join our Association; get aboard our ship, for we are now on the crest of a great flood tide which is going to carry the gospel of forestry to every corner of our country.

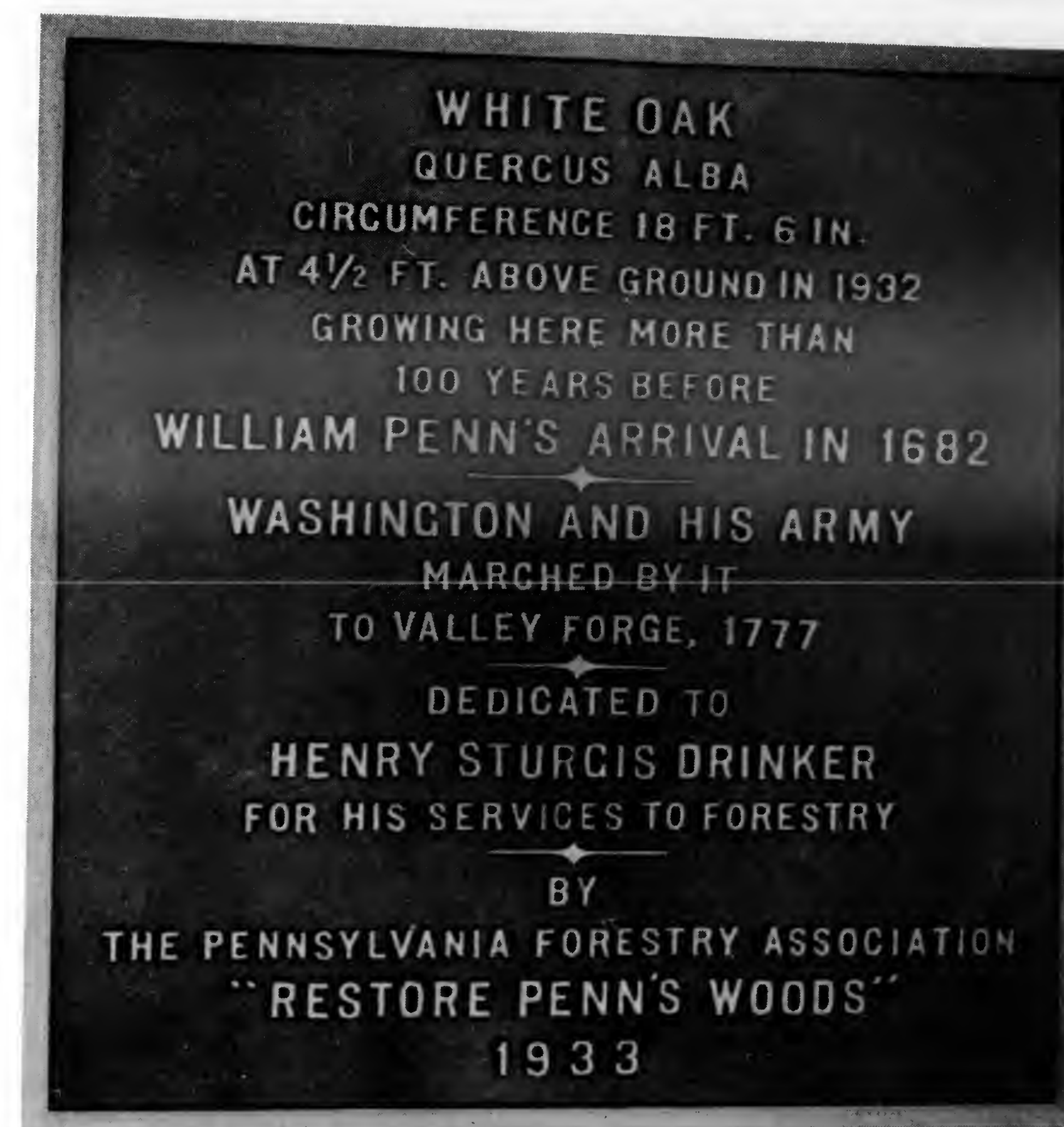
"With over 300,000 of our young men in the Conservation Camps there is opening a new vision of life. As they in turn have 3 or 4 in their family connections, it means that over a million people throughout the land are getting a new vision of the great out-of-doors, with all its charms and inspirations.

"Like everyone else we are now turning over a new leaf; in fact, we have turned over so many lately we feel we should be pretty nearly through the book. The most recent one our Association has turned out is 'Penn's Woods, 1682-1932', by our fellow member, Dr. Edward E. Wildman, Director of Science of the Philadelphia Public Schools, and from the way this has been received there is surely indicated a great awakening of interest in historic trees. On page 71 of this book you will find a description of this grand old tree we are here to dedicate. I regret very much that Dr. Wildman is unable to be with us today, as he would greatly appreciate the effort that is being made to perpetuate and foster the interest in historic trees which were a part of the original Penn's Woods."

The Chair announced that on behalf of the donors (Mr. and Mrs. Alexander H. Crockett) there would follow the formal presentation by Mr. Crockett.

"Someone has said that the foundation of institutions that minister to the human body are no more important than the preservation of a natural institution that ministers to the needs of the human soul.

"This grand old oak always seemed to me just that, 'a natural institution', ministering to all that pass beneath it.



Courtesy of Evening Bulletin.

"No greater power, one feels, sent forth the shining glances of the sun than thrust these pillars above the earth.

"Mrs. Crockett and myself are very happy to present to the Commonwealth of Pennsylvania the old white oak with its appurtenant land, and to join with you all in dedicating the tree to the memory of Dr. Henry S. Drinker, who rendered such valuable service to his state and nation in the promotion of forestry."

The gift was accepted on behalf of the Commonwealth by Dr. Albert Cook Myers, Secretary of the Historical Commission of Pennsylvania and Chairman of the Historical Committee of the Valley Forge Park Commission. Dr. Myers made a brief address in which he told some interesting historical associations of the land on which this tree stood.

The bronze marker was unveiled by Mrs.

Crockett, after which the Secretary read the following quotations from letters.

From Dr. Natt M. Emery, Vice-President of Lehigh University:

"The formal dedication of this tree to Henry Sturgis Drinker by members of the Pennsylvania Forestry Association is a gracious expression of their appreciation of his distinguished accomplishments in the promotion of scientific forestry in this Commonwealth and in this nation. It is, moreover, a recognition of a citizen who has intelligently and energetically devoted himself to public service."

From Hon. Lewis E. Staley, Secretary Department of Forests and Waters, Commonwealth of Pennsylvania:

"The idea of dedicating the tree to the memory of Dr. Henry S. Drinker is most commendable, and I am sure that in endorsing the plan I speak for the entire State Forest Service. Dr.

Drinker rendered valuable and lasting service to the Commonwealth in the promotion of forestry. It is particularly fitting that this old oak should typify the strength and courage of his character and the enduring quality of his service."

The Secretary then delivered the Dedicatory Address.

"We have united today to witness the transfer of this splendid survivor of Penn's Woods to the Commonwealth of Pennsylvania; and to dedicate it to a man whose many and altruistic services have contributed to the good of the people of this State and Nation.

"This transfer, and this dedication, represent the acts of a number of Pennsylvanians, who united their efforts that this ancient monarch might be preserved in its stately grandeur, and that its historical association with the early development of the Nation and the State may be recorded in enduring bronze; that the lesson of trees' benefits to man be emphasized;—and further, that The Pennsylvania Forestry Association may also express in the imperishable bronze a well deserved tribute to the work for the common weal which was so long and effectively done by our beloved President Emeritus, Dr. Henry Sturgis Drinker. Our pleasure in this public recognition of his work is lessened by our regrets for Dr. Drinker's inability to be here today.

"It is proper to here digress, to acknowledge the generous act of Mr. and Mrs. Crockett, who have today deeded to the Commonwealth this tree and ground surrounding it, so as to assure the care and preservation of this tree beyond their allotted span of years. In this purpose we have been gratified to assist, for we recognize that they have given more than the tree and an area of land—they have made a contribution to our esthetic life, have preserved an historical landmark, and have added to our inspirational interests.

"Spurred by this gift, and following the suggestion of Mr. Henry R. Frorer, a number of public spirited citizens in this region contributed, so that the ravages of time and past storms might be repaired, and this tree be protected against further decay. As a result of their example, some of the members of The Pennsylvania Forestry Association took similar action, so that a bronze marker could be placed

to tell those passing what this tree signifies. To crown these acts, it is a pleasure to relate that the Historical Commission of Pennsylvania has unanimously voted to accept for the Commonwealth this arboreal link with the days when the first European settlement on this continent was made. All the history of our Nation has occurred during the interval this tree has stood here. The romance and the story of St. Augustine, Plymouth Rock, Penn's Treaty with the Indians, Valley Forge, the Alamo, Gettysburg, San Juan Hill and the Armistice Day;—all have occurred while this tree grew from a sapling to its present majesty.

"To realize the importance of the work for which we today pay a merited tribute to Dr. Drinker, we must return to the time when this tree was but one of the thousands of millions of trees in Penn's Woods. From these wooded hills the aborigines obtained much of their sustenance, their fuel, and the animal skins they used. To the white settler who followed, Penn's Woods gave more to meet his greater demand. From our native forests came material for the first log cabins, and the beams and boards for the later houses. Wood for cooking and heating in the homes; maple sugar for sweetening; wild fruits and nuts and game and fish for the larder; hickory fiber for ropes; dyes for cloth; wood for farm implements; acorns and beech mast for swine; skins and furs to protect the body; medicinal barks and herbs; and clear springs and streams of water—all these were the gifts of the forest to the pioneers. Those who followed received other benefits. From Nature's storehouse of sylvan richness came the materials from which were built the thousands of homes and barns, the fleets of canal boats, river packets and barges, the Conestoga wagons, and later the wooden coaches and freight cars that traveled over millions of railroad ties cut from the forests. Nor should we fail to recall the masts and spars, as well as the hulls of sailing vessels that transported the increasing commerce of a growing Nation. The wagons that carried supplies for the Continental Army were built of wood from the native forests. Even such recent developments as the automobile and the airplane were, until recently, equipped with bodies mainly constructed of wood, and they still utilize much of this material.

"Valley Forge took its name from an old forge, which, like the other iron works of that day, used as its fuel charcoal made from trees cut in Penn's Woods.

"It was right that trees should be cut and put to the use of man. It was also right that the use of our forest products should be enlarged to supply the greater needs of a higher developed scale of living. And it was right that areas should be cleared, in order that more land might be brought under the plow to meet the requirements of increasing population.

"But it was never right, nor is it right today, that timbered regions should be marketed by a ruthless process of cutting off every visible tree, with no provision for future growth,—and the area then abandoned. Millions of acres of Penn's Woods have been so treated,—and what is the result. Regeneration could only come from the few seeds and sprouts that had escaped destruction, making restoration a slow process and one often seriously retarded by the encroachment of less valuable plant growth. The wild life has been driven away. There are no living roots to hold together the rich humus covering which Nature had been generations in building, and which acted as a sponge to receive and slowly release the rains and snows. There are no trees to break the force of heavy downpours, and to shade the fallen snows so that melting would be retarded. The full force of the sun beats upon such young trees as have survived. Severe rains, instead of being absorbed, cause heavy torrents to rush unchecked down the slopes, washing the valuable topsoil into the valleys, silting the streams and damaging the fertile bottom lands. This process continues, and each time the damage increases, until the productivity of large areas has been utterly destroyed.

"Then too, the rapid growth and development of the country produced a rate of cutting many times greater than the increase by natural growth; and new forests were not being planted. A few more generations and there would be no more forests to cut. We were headed, in the face of their example, toward the treelessness which has been so deleterious to some other countries.

"A few saw this. A few realized that we were exhausting too fast what had appeared

to be an illimitable resource. A few recognized the damage to our people's welfare and happiness if such careless methods were allowed to continue unchecked. And they began to teach the people that our forests must, at least in part, be replaced. And this message they conveyed also to those who administer our State and National governments. With the evidence in view, with the facts at hand, they slowly built up a recognition of what the Secretary of Agriculture has recently referred to as 'one of the major problems of the government.'

"Due to their work, the United States now owns more than 160,000,000 acres of National Forests, and this Commonwealth possesses more than 1,600,000 acres of State Forests; all purchased at low prices, and each day increasing in growth of timber for future cutting. Impressive as these figures are, the total is still inadequate to replace existing depletion and to provide for the future. Not only is there a need for more forests in Pennsylvania, but the opportunity exists in 4,000,000 acres of cut-over, waste and abandoned land. To render such land productive, this Association continues the policies stated in its charter:

"The object of the Pennsylvania Forestry Association shall be to secure and maintain a due proportion of forest area throughout the State; to disseminate information concerning the growth, protection and utilization of forests; to show the great evil resulting from forest destruction, in the decrease and unequal distribution of the available water supplies, the impoverishment of soil, the injury to various industries, and the change in the climate; to secure the enactment of such laws and the enforcement of the same, as shall tend to increase and preserve the forests of the State.'

"The Pennsylvania Forestry Association has, for nearly a half-century, devoted its activities to the encouragement of forestry, both public and private, in Pennsylvania. Having been responsible for the original and much of the subsequent forestry legislation in our State, it views with satisfaction one and two-thirds million acres, once denuded, which are now growing new forests. It is also gratified to know that more than 110,000,000 new trees have been planted on private lands, and that an efficient organization combats the red menace

of fire throughout the State; and that a continual research is being carried on to add to the knowledge of caring for our forests and to combat their natural enemies. These State Forests are not only a commercial utilization of what would otherwise be waste land; they afford recreation each year to more than half a million Pennsylvanians. Not only the hunter and the fisherman, but the camper and the transient visitor use and enjoy the State Forests. For them the Commonwealth has rebuilt Nature's cathedrals.

"In this work, both State and National, Dr. Drinker was an enthusiastic and tireless worker. One who knows him very well said that he put his interest in trees second only to his interest in young men. Even when acting as President of Lehigh University, for which he builded so well, he found time to foster and further forestry, and after his retirement from this educational activity, he continued this work. Among his contributions to the cause was work for the modification of existing tax laws, so that tree growing would not be unfairly penalized. As a member of the Council and a President of the Pennsylvania Forestry Association, as a director and a President of the American Forestry Association, as a member of the Forestry Commission of Pennsylvania, and of the Forestry Committee of the United States Chamber of Commerce, and an active worker in conservation organizations, he has given to his State and to his country a very practical idealism for the common good. The late Dr. John Grier Hibben wrote of Dr. Drinker as a man of 'enlightened patriotism, discerning vision, and untiring labor.'

"Such a man seeks no publicity; he seeks no honors. When we asked Dr. Drinker if we might dedicate this tree to him as a testimony of our appreciation of his work, he replied, 'I was only carrying on what Dr. Rothrock started.'

"Because he did carry on, and because he labored so well, we, who know the man and know his work, take a very special pleasure in today dedicating to him this survivor of the Penn's Woods which he has done so much to restore. His example is an inspiration to us who also seek to carry on the work. In recognition of his example we have here placed a bronze tablet, which, as he would wish, states

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The exercises closed with the address of Mr. Ellwood B. Chapman, President, Pennsylvania Parks Association:

"It is indeed an unusual opportunity that we have today to witness the presentation to the State of such a gift as this magnificent tree. It is still more rare, though, to see a gift that is more than 400 years old. It is difficult to visualize the scenes that have been witnessed by this grand old sentinel of the forest during this unusual life time.

"Doubtless it was standing here in its youth when Columbus visited these shores. Then after a lapse of a couple of centuries, it witnessed the arrival of William Penn and his followers, coming to found upon the Delaware nearby, the City of Brotherly Love, where each might worship in safety according to the dictates of his own conscience.

"Another century rolled by and the old tree saw the sufferings of the hard-pressed army of Washington encamped at Valley Forge but a few miles away, during their heroic struggles at the time of the Revolution.

"Still another century and the war between the North and the South pressed close at our own borders.

"Then within very recent years, the old tree has heard the marching tread of the thousands of young men who were ready to cross the sea to participate in the greatest war of all history.

"But, let us leave these scenes of carnage and view the pleasant side of our old friend's lifetime.

"Doubtless in his youth, he was but one of the many trees that made up the magnificent forests of Pennsylvania, known for generations as Penn's Woods. With the inroads of increasing population, his brothers fell before the woodman's axe to make way for the fertile fields that were soon to be cultivated, but happily he was spared.

"For the first 300 years of his life, there was but little social and cultural change; economic progress was slow, but the 50 years from 1870-1920 witnessed greater progress than in all the centuries preceding; and the succeeding decade since the Great War has witnessed even greater



KING OF PRUSSIA OAK—MRS. CROCKETT, MR. CROCKETT, MR. BIRKINBINE AND MR. FRORER

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"The Machine Age of today has cut down the hours of labor to such an extent that the increased leisure thus afforded has become a tremendous problem. Dr. Rothrock and Dr. Drinker have done magnificent work in the Forestry Association and we would be remiss if we did not recognize the efforts of Mr. Smedley and his Associates who carry it on. The Parks Association is asking that we take one step further forward to put the forests to their best and highest use and to provide facilities for their enjoyment by the vast hordes from our congested centres of population.

"Whether we recognize it or not, the five-day week is here. If the idle time be spent in the enjoyment of the great out-doors, it may prove a blessing, but if spent in the crowded districts of our great cities, it will prove a curse.

"May we hope that you will all join us in our efforts to provide recreational facilities near our large centres of population, that our citizens may be brought into the great out-doors and be benefited not only in body and mind, but spiritually as well."

INTERESTING FOREST FACTS*

By George S. Perry, Senior Research Forester, Pennsylvania Forest Research Institute, Mont Alto, Pa.

IN AGRICULTURE each farmer usually has one or two chief money crops. In addition he may grow two or three others incidentally to round out his rotation and improve the soil or feed his stock. In the same way, the Old World foresters, enjoying far greater uniformity of soil and rainfall over their small units of management, can emphasize one tree over their forests and even over entire localities and regions. In fact, nature has given Europe so few tree kinds that forestry there is far simpler than is the case in Pennsylvania. Here there are often very different native forest types on two sides of the same mountain or in the valleys, and on lower, middle and upper slopes,—because, of course, soils differ, moisture varies and fluctuates greatly and very erratically. Lumbering methods and occurrence or absence of forest fires have also complicated matters. This explains why our forestry will often be both wasteful and disappointing, if we blindly follow formu-

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of fire throughout the State; and that a continual research is being carried on to add to the knowledge of caring for our forests and to combat their natural enemies. These State Forests are not only a commercial utilization of what would otherwise be waste land; they afford recreation each year to more than half a million Pennsylvanians. Not only the hunter and the fisherman, but the camper and the transient visitor use and enjoy the State Forests. For them the Commonwealth has rebuilt Nature's cathedrals.

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lae worked out in other lands or regions, and fail to investigate and solve our own problems. It is doubtful whether any region outside the tropics surpasses Pennsylvania in number of forestry problems and possibilities.

To lay a safe and solid foundation for forestry, we must dig down to bed rock nature, then build with blocks of knowledge quarried from the mountain of eternal truth. Each of the several headings that follow are more or less unrelated, but they must be considered as both interesting and important to real progress in handling our woodlands.

FOREST TYPES ARE A SAFE GUIDE

Anyone has noticed in the forest that certain trees are commonly associated. White pine and hemlock; hemlock and yellow birch; beech and sugar maple; red oak, white ash and cucumber; pitch pine, rock oak, and scarlet oak; white oak, hickory, and black oak; river birch, silver maple, and sycamore; are examples. If we imitate nature our chances for success are excellent, but when we take some silvicultural short cut we invite calamity. Along with the various forest types are found certain shrubs and herbs that rarely occur where other trees predominate. Such typical plants, as well as the trees which may be found on an area, if they grow thriftily, are splendid indicators of what intensive forestry can or cannot profitably grow there. For example: red oak is the only tree of all the oaks suitable to grow on white pine soils.

TREES AT THE LIMIT OF THEIR RANGE

When a tree is planted beyond its bounds of natural distribution, it is always watched with interest. Gardeners have grown hundreds of flowering shrubs and ornamental forms far north of their original homes. Now we find that forest trees are also able to migrate northward. This is but logical, since the glacial era exterminated many trees toward the north; and drove them south where the climate was more hospitable, and now they are slowly moving back northward, reoccupying terrain they held ages ago. Shortleaf pine from seed collected at Mont Alto is now growing well near Williamsport and Emporium. Loblolly pine, common on old fields in the South, has been making very rapid growth at Mont Alto from seed collected on the Eastern Shore of Mary-

land. Burr oak, only native in the valleys of the warmer parts of Pennsylvania, has been found hardy in Potter and Susquehanna Counties. The bald cypress, that slow growing and typical swamp tree of the South, is growing successfully around Philadelphia, at Mont Alto, Mercersburg, Gettysburg, Mauch Chunk, and many other places. Sweet gum also grows well now far beyond its usual cold limit of range.

VARIATIONS IN HABITAT

Taking nature as a guide, we might expect that trees would grow best in such soils as they naturally frequent. This is by no means always true. In fact, probably all trees of extreme habitats occupy them by compulsion, since slow growth rate or high light requirements put them at a disadvantage in competing for the more favorable areas, hence they are forced to take refuge in swamps or on dry rocky ridges where few or no other trees can survive. Southern trees of moist or wet soils such as sweet gum, loblolly pine, water oak, and bald cypress, do best when north of their range if they are planted on well drained but fairly fertile soil. Of course, this is reasonable, since drier sites are warmer and permit a longer growing season than wet sites afford. American larch or tamarack and arborvitae are examples of northern swamp trees that succeed best on well drained loam soils. Not all trees of poor soils will grow well on better or more moist ones. Pitch pine and some other modest conifers cannot survive in their early seedling stage on good soils, as they practically always fall victims to attacks of damping-off fungi. If transplanted on good soils after they are woody enough to be safe, they will not grow much faster than on poor sites, so they are in constant danger from the competition of grass, weeds, and other growth and need much assistance from man.

TREES AND CHANGES IN ENVIRONMENT

Hon. S. B. Elliott knew well and often cited the hemlock as a tree that was very sensitive to changes about it. In fact, he predicted the extinction of this important Pennsylvania tree so far as intensive managed forestry is concerned. Older trees dry up, or succumb to bark beetle attacks, when thinning or selection cuttings remove the shade of their neighbors.

Young trees must be crowded so that they grow very slowly, or else they will retain every limb and produce nothing but knots. When lumbermen cut to a diameter limit in the hemlock woods and took care to save all trees under 8 or 10 inches in diameter breast high, hardly one out of a hundred such trees would remain alive five years later. Wind would throw many if they escaped other dangers, and those that resisted became so shaky that their woods was of little value. Mr. Elliott advised clear cutting this tree and replacing it with something that would lend itself better to forestry treatment, evidently having white and red pines in mind, with Norway spruce as a possible substitute. However, admitting that the official tree of Pennsylvania is erratic and hard to handle, it is believed that forestry will yet find hemlock a desirable and worthy member of our woody flora.

The feature of hemlock which most impressed Mr. Elliott also holds to a lesser extent for all trees, about in direct proportion to their tolerance and indirectly with the depth of their root systems. Where is desired to preserve a fine stand of virgin growth, or even middle aged forest, the surrounding woodlands should never be cut clear, except possibly on the north, and it is best if cutting be restricted to the removal of diseased trees and hopeless cripples. Otherwise, the forest that is to be retained may dwindle away rapidly as wind, sun, and insects eat into the stand from the open edges.

ADAPTABILITY OF TREES TO INTENSIVE FORESTRY

Many trees besides hemlock are rather ill adapted to forestry for rapid growth and heavy yields per acre. Most of the oaks, as well as beech, elms and maples, tend to form wide crowns or forked boles, with persistent large limbs, whenever given enough growing space to stimulate their growth rate. This means that where such trees are grown, the forest stands should be kept about as dense as possible for the first 40 years, only then can intensive management begin, with frequent light thinnings to get maximum growth on the trees after they have attained satisfactory heights and clean, straight trunks.

ROOT DEFORMITY IN PLANTED TREES

The drought years, 1930 and 1932, had serious lessons for forestry, and it is doubtful if all these are being appreciated. In several south central counties of Pennsylvania the losses of hemlock, white pine, and other conifers, directly or indirectly because of drought, were so heavy as to be a greater local disaster than was the chestnut bark disease. From this occurrence it would appear that only tap-rooted trees, or those with very extensive roots such as locust, should be made main crop trees on shale soils and dry slopes.

Certain forest plantations also suffered. In cases where the loss was complete or nearly so, it is evident that the site was too dry for the trees in question, but where occasionally a considerable part of the trees died, while others lived in a thrifty state, investigation showed that practically every dead tree had its roots deformed in planting. The trouble was worse where good big stock was planted, as the workmen probably often cramped and doubled the extensive roots of the trees into a hole far too small for them. A tree planted that way will live and make very good growth so long as seasons are favorable but it will rarely or ever develop a tap-root, hence it is claimed in Europe that even after decades of growth, trees planted with roots in unnatural positions may finally fail and cause a very promising forest stand to become a wreck. For this reason two-year-old seedlings, and even one-year-olds, are preferred for planting rather than the older seedlings and transplants, which make an impressive appearance that may be a delusion and a snare in the end. Experiments on both scrub oak lands and old fields show two-year-old stock better than three for Scotch and white pines, while three-year seedlings of red pine are superior to older transplants so far as establishment is concerned.

PESTS IN THE FOREST

It is rarely possible in forestry to take artificial measures against insects and diseases, as we see the farmer and orchardist do. Natural or nearly natural means must be used to protect the trees. In the virgin forest there usually existed an approximate balance of nature. Foresters and forest owners must strive to attain such a balance. Even rodents guilty of girdling

young trees, eating seeds and roots, and destroying the eggs or young of birds, are found to aid greatly in holding white pine weevil and larch saw-fly in check, since these insects, like many others, spend 70 to 90 per cent of their life cycle hibernating or hiding in the litter or soil of the forest floor, where rodents eat them with avidity.

White pine blister rust is an example of alternation of hosts, where we attack the pest at the weak link in its chain of development—the currant and gooseberry. People often marvel at the complex life history of this tree disease, yet it is not so unusual. Man has an example in malaria where the disease alternates in the *anopheles* mosquito. Wheat rust goes to the common barberry and back. Apple scab is transmitted by the red juniper.

The foregoing are only a few desultory illustrations proving how we must dedicate our best scientific efforts to the service of forestry, if a needy world is to continue in the fullest enjoyment of the countless and priceless services yielded, directly and collaterally, by green forests.

NEARLY A HUNDRED YEARS AGO

In Dickens' "American Notes", during the relation of his trip from Harrisburg to Pittsburgh (by canal boat, and inclined plane over the Alleghenies), he says:

"It was quite sad and oppressive to come upon great tracts where settlers had been burning down the trees, and where their wounded bodies lay about, like those of murdered creatures; while here and there some charred and blackened giant reared aloft two withered arms, and seemed to call down curses on his foes."

Later in describing his journey from Pittsburgh to Cincinnati by steamboat he wrote:

"The night is dark, and we proceed within the shadow of the wooded bank, which makes it darker. After gliding past the sombre maze of boughs for a long time, we come upon an open space where the tall trees are burning. The shape of every branch and twig is expressed in a deep red glow; and as the light stirs and ruffles it, they seem to vegetate in fire. It is such a sight as we read of in legends of enchanted forests—saving that it is sad to see these noble works wasting away so awfully alone, and to think how many years must come

and go before the magic that created them will rear their like upon this ground again. But the time will come: and when, in their changed ashes, the growth of centuries unborn has struck its roots, the restless men of distant ages will repair to these again unpeopled solitudes; and their fellows, in cities far away, that slumber now, perhaps, beneath the rolling sea, will read in language strange to any ears in being now, but very old to them, of primeval forests where the axe was never heard, and where the jungled ground was never trodden by human foot."

On October 30th the National Forest Reservation Commission approved the purchase of 954,632 acres of forest lands in 20 states, at an average of \$2.11 per acre. Among the items was the acquisition of 5,583 acres to be added to the Allegheny National forest in northwestern Pennsylvania.

C. C. C. CAMPS CONTINUED

PRESIDENT ROOSEVELT has continued for a second six months the work by the Civilian Conservation Corps, assuring extension of both the unemployment relief and the benefits to forests and erosion prevention. Because of rigorous winter conditions 550 camps were transferred from some of the northern regions to southern locations, leaving 916 in their original sites. Twenty-five of the new camps are in the Tennessee Valley, for which work our member, Mr. E. C. M. Richards is Chief Forester. The continued camps are equipped with wooden barrack buildings, mess and recreational hall and heated shower bath house. Similar structures are at 350 of the new camps; the other 200 in the South have mess and utility buildings, and continue the use of tents for sleeping. All camps are to be electrically lighted.

This construction has produced immediate additional employment and sales to carpenters, laborers, lumber companies, manufacturers of insulating material and hardware, etc., and such purchases as 15,000 wood-burning stoves, 250,000,000 feet of lumber and hundreds of thousands of blankets, gloves and other articles for wear and sleeping comfort.

Mr. Robert Fechner, Director of Emergency



SUMMER QUARTERS OF C.C.C. CAMP AT PROMISED LAND

Work, stated that replacements would bring in 126,000 new men in a total enrollment of over 300,000, which includes 14,400 Indians, 26,000 war veterans and 25,000 foresters and woodsmen to direct the activities.

The activities of these men cover many fields: roads and trails, fire lanes, telephone lines, eradication of rodents, poisonous and harmful plants, improvement cutting, replanting, combating plant diseases, blister rust prevention, erosion control, all helpful in assuring a better timber crop from the forests. Already the work done by and the presence and co-operation of the men in the C. C. C. has made a material reduction in the fire loss in the National forests.

Only one State—and that with large areas of National forest—has more camps than Pennsylvania with its 104 camps, of which 92 are on State Forests. As an index of their work Secretary Staley has related that in the two months of July and August these workers built 595 miles of roads and trails, protected 25,000 acres of forest land from blister rust, removed fire hazards from more than 500 acres, and improved and thinned 626 acres. He has said, "I am gratified that the Pennsylvania State Forests are able to afford this opportunity for these young men to grow in body and

mind by doing important creative work, and I believe they will complete their enrollment better trained and equipped to face the future. The labor they are performing within the State Forests is definitely putting Penn's Woods in a more productive condition."

To the credit of the State and to its Department of Forests and Waters it should be stated why we have so many camps in the State Forests. It was not due to the area of the State (which stands 32nd on the list) or to its population (in which it ranks second) or to any preferment. While State quotas were based on population, the location of employment was determined by other factors. It was because we had the forests and we had a plan. Our Commonwealth is notable for the good work it has done in forestation, and for which we are indebted to the energy and vision of those who sensed the need and made it a practical reality. Further, a year before these forest camps were established, Mr. Staley and his organization had worked out in detail a plan to utilize unemployed in forest improvement, and only awaited the means. Thus, when the opportunity was offered Pennsylvania was ready, and as a result we have been obtaining a continuing benefit to the increase and protection of one of our major natural resources.

GAME MANAGEMENT AND THE FOREST

By W. Gard Conklin, Chief of Bureau of Refuges and Lands, Game Commission of Pennsylvania—Presented at 1933 Summer Meeting

THIS SUBJECT is one which involves so many factors having a direct bearing on the practice of forestry and the production of game, that its discussion in so limited a time can touch only the high lights. The real purpose of this paper is to establish in the minds of you who are interested in the broad subject of conservation, and of forestry in particular, the fact that game has an important economic relation to the forest.

Game management, as described by Aldo Leopold in his recent publication on this subject, "is the art of making land produce sustained annual crops of wild game for recreational use." It includes not only the conservation of the existing supply but also the technique of increasing this supply to the carrying capacity of the range. In preparing this paper I have kept in mind principally those species of wild mammals and birds whose natural habitat is found in woodland areas, and which, under the laws of the State, are classed as game. The species most commonly known, largely because of their abundance and greater recreational value, are:

Black bear, of which anywhere from 300 to 600 are legally taken each year.

White tailed deer, the kill of which in 1931 reached the almost unbelievable number of 95,051, although the average kill is usually about 25,000.

Wild turkeys, with a record annual kill of between 3,000 and 4,000.

Ruffed grouse, frequently but incorrectly called pheasants, the annual kill of which has reached in excess of 500,000 but for the past few years was about 100,000.

Squirrels, gray and black, representing an annual legal kill of about one-half million.

Rabbits, cottontail and snowshoe, the latter found almost exclusively in the woods, whereas the cottontails are more abundant in agricultural areas. The annual kill of rabbits averages 3,000,000. Data is not avail-

able to determine what proportion comes from the woods.

Raccoons, more valuable for their fur than for meat, are distinctly woodland animals. The annual kill in Pennsylvania is about 40,000.

The value of game and fur bearing animals legally taken in the State in a single year amounts to approximately \$8,000,000. Of this it is safe to predict that at least 50 per cent is brought from the woods. I think this can be greatly increased by proper management and without detriment to the woods.

Game constitutes a crop of the land to be harvested just as timber or grain, and similarly has its rightful place in the field of economics. Unfortunately less seems to be known concerning the proper management of game to produce a maximum crop than is the case with timber and grain. The forester knows what is necessary to produce timber although, unfortunately, certain almost uncontrollable factors, or perhaps natural elements, handicap him to such an extent that he cannot, in this country, put into practice all of this knowledge. The up-to-date farmer likewise knows what should be done to produce from his fields a maximum crop of potatoes, or grain or hay. But the art of producing a game crop has lagged behind these many decades, and only now is this important economic question being given real scientific study.

I would like to take this opportunity of calling attention to Aldo Leopold's recent publication on "Game Management." Mr. Leopold is a forester, having had many years of experience with the United States Forest Service, and is a naturalist of note. His studies of game, its natural environment and habits, and the factors effecting its abundance or scarcity, brought him to the attention of nationally known sportsmen who employed him to plan and direct extensive game surveys in the middle west. The knowledge he gained through actual experience is set forth in his new book, "Game Management," published by Charles Scribner's Sons, New York. I consider him the foremost exponent of game as a land crop and particularly woodland game as a forest crop in this country. An extract from the "Preface" of his book explains its three-fold purpose:

"First, to serve as a text for those practicing game management or studying it as a profession.

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Although I have not read the book in its entirety I feel perfectly safe in recommending it heartily to anyone interested in game management.

Game management dates back almost to the beginning of history, yet as a science it may well be said to be in its infancy. Hunting restrictions are found in the Bible. The ancient Romans were forced by the upper classes to observe certain restrictions to conserve the supply for recreation. The Greeks sponsored hunting, realizing, just as our beloved Dr. Joseph T. Rothrock realized, that the art of hunting had a beneficial effect in creating good soldiers in time of war. The feudal lords of medieval times laid down stringent restrictions against promiscuous hunting, so they themselves could easily get all they wanted, and in more recent time royalty in Europe decreed that game belonged to them and not the general public. The practice of game conservation was then based on selfish motives. Now, in this country especially, but not so in Europe even today, the conservation of game is for the benefit of the people as a whole and not for the privileged few.

Laws regulating hunting were and are mainly conservation measures and are merely a part of that which is necessary in an intensive and effective plan of management. Restrictive hunting laws will not alone satisfy present day requirements. They will not, except accidentally, result in the range being stocked to capacity, although they may produce a sustained yield. Proper management for a game crop must be based on a great many factors, among the important ones are:

1. The suitability of the range for certain species.

2. Quantity, extent and distribution of trees, shrubs, weeds, etc., which furnish food and cover.

3. Water.

4. Data helpful in determining the carrying capacity of the range for particular species.

5. The cruising radius of the respective species in the everlasting search for food, protection from natural enemies, and even for a mate.

6. Sex ratios sanctioned by nature, or which may be influenced by man. This has a direct bearing on the production of a maximum crop and the stamina of the offspring.

7. Control of disease which might result in disastrous epidemics. There seems to be less danger of disease reaching the point of an epidemic in woodland game than there is in farm game. One of the reasons for greater danger to farm game is the close proximity of domestic animals. It is a well known fact that game birds are more susceptible to disease than domestic fowl.

8. The control, but not necessarily the extermination, of predatory animals.

9. Restocking depleted areas with game raised on farms under more or less domestic conditions, or by transplanting from overstocked areas.

10. Control of forest fires. Woodland game losses from fires are enormous.

11. The creation of game refuges of sufficient size and number to assure breeding stock, should the open areas be badly depleted by over shooting.

We believe that in Pennsylvania we are now practicing the world's best system of game management, keeping in mind that every resident as well as many non-residents, are potential hunters and that the sport is not limited to the privileged few. But our plan is by no means perfect and perhaps not even approaching perfection. We have adequate restrictive laws which are flexible, permitting the Board to lengthen or shorten seasons, or change bag limits as the occasion requires. We have a system of game refuges unequaled elsewhere and three game farms producing thousands of ringnecked pheasants and hundreds of wild turkeys for restocking. Predatory animals are

kept well under control and hunters observe restrictive laws remarkably well. But some of the other factors of management are inadequate or perhaps entirely lacking. Who knows what constitutes a safe sex ratio in the deer herd, or to what extent the large surplus of does to bucks is effecting the size and quality of the offspring? The same is true of ring-necked pheasants. Who knows even the approximate number of acres of woodland required to maintain one deer, or why the ruffed grouse population had become so badly depleted and is now gradually increasing? We have little authentic data on the cruising radius of the various species of game. Neither do we know definitely the various types of growth required for the different species in order to provide a habitable range. We do not know why wild turkeys are not increasing as desired nor why they prefer one mountain to another having apparently similar conditions. We are attempting to produce a maximum crop of game without knowing all that we should about its life habits. Even though we consider Pennsylvania's management good there is ample room for improvement through scientific research and by the correction of faults disclosed. In other words the conservation phase of game management in this State has reached a fairly high degree of perfection, and the next progressive stage in our plan of management depends to a large extent on scientific research.

By far the largest majority of the State's game refuges are in woodland areas. This is not by design but because it is almost out of the question to acquire suitable territory, or its use, in the better agricultural areas. Fortunately, farm game can be propagated on game farms, or purchased outside of the State, for restocking, whereas woodland game from such sources is available only in very limited quantities, if at all. Therefore game refuges in the woods are far more essential than elsewhere and our plan of game management is subject to less criticism because few refuges are maintained in agricultural sections of the State.

Since the forests of Pennsylvania produce something like four million dollars worth of game annually, and since game constitutes a great recreational attraction to the forest, it is logical to believe every forester will become "game minded" as well as "timber minded."

If he does not he fails in his duty to the people. He must, sooner or later, to a reasonable extent, assume the responsibility of managing the forest, not only to produce timber but likewise game. In this connection he must know and foster game food producing species of trees and shrubs, which species he classes as forest weeds. With a few exceptions a reasonable quantity of game in the forest is no detriment to the production of timber. Rabbits, ruffed grouse and wild turkeys are harmless. Deer, except when they become too numerous as they were in this State a few years ago, make no material difference in producing timber even though they do browse on twigs and buds. Most of this browsing is on the weed species. Bear are not to be seriously condemned because they occasionally break off branches of the beech or break down a few devils clubs. This does not effect the production of a timber crop, especially as the fruits and nuts they seek are, with the possible exception of beech, from species of no commercial value. Raccoons may live in hollow trees but no blame can be attached to them for they did not cause the decay. Squirrels likewise live in trees and feed on nuts, but for every nut they eat, they plant one and possibly a dozen which germinate, and if growing conditions are favorable, many trees result. It is granted that beaver are becoming a destructive agency to timber but beaver are not classed as game* and therefore can be disregarded in so far as this paper is concerned. It is hoped that every forester in the State will soon realize his responsibility in the interest of game.

I have been a member of the Pennsylvania Forestry Association for more than twenty years and can recall the time when the subject of game as a forest crop was not even thought of in the Association's proceedings. It is distinctly pleasing to note the change which has taken place during the last five years or so and to have had this opportunity of speaking on game management.

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**End of
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